

The background of the image features a dark, abstract geometric design with various shades of grey and black, creating a sense of depth and movement. A solid red horizontal band is positioned at the top of the frame.

POWERSVISION CONFIGURATION STUDIO® VERSION 2.8



More than 75 years ago, our products started with a simple idea — identify an unmet need in the industry and provide a reliable solution. Since then our product offering has grown to more than 3,800 products.

Our ever-expanding product breadth includes sophisticated engine control and monitoring systems, electronic and mechanical controls, custom engineered control panels and systems, battery chargers, expandable I/O module and a whole array of electronic displays. We offer full solutions for your challenging projects.

ABOUT US

WWW.FWMURPHY.COM

We Are Innovators.

We led the way in helping to meet the latest engine environmental emissions regulations with instrumentation that eases the transition to electronic engines. We continue to explore new technologies and develop new products for emerging market needs. Murphy innovations don't just apply to products. We have integrated a standard operating system which utilizes lean manufacturing and Six Sigma for maximum productivity.

We Are Customer Driven.

We pride ourselves on customer satisfaction and service. We work closely with our customers to design and deliver innovative and reliable products for specific applications. Our goal is to not only meet, but to exceed customer expectations in order to become your preferred partner.

We Are Global.

We are where our customers are. North American operations are centrally located in Tulsa, Oklahoma, with additional offices in San Antonio and Rosenberg, Texas. Our international manufacturing operations are located in Europe and China, with sales offices in India, South Korea and Latin America. Customer support is achieved through our extensive distributor and dealer networks available throughout the world.

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Getting Started

- Compatible Displays
- File Structure
- File Naming
- Navigating Through PowerVision
- Understanding Tabs

2

Basic Page Designer

- Navigating the Page Designer Tab
- Using Proper Naming Conventions
- Using Gauges and Widgets
- Inputting J1939 Variables
- Creating Pages
- Changing Properties
- Warning Zones
- Visible Conditions
- Changing Default Gauge Values
- Saving Gauges to the Toolbox
- Understanding Containers
- Creating Page Navigation
- Calculation Events

3

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- Using Graphics to Build a Configuration
- Understand Graphic Layers
- Using Multiple Gauges and Widgets Together
- Inputting Fonts
- Adding Languages
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- Creating Page Views
- Assigning Page Navigation
- Assigning Touch Actions
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- Example of Mock-Up
- PV780
- PV480
- PV450
- PV380
- Graph Paper

THE ESSENTIALS

PowerVision Configuration Studio® Software

Version 2.8

Workbook 2016.12



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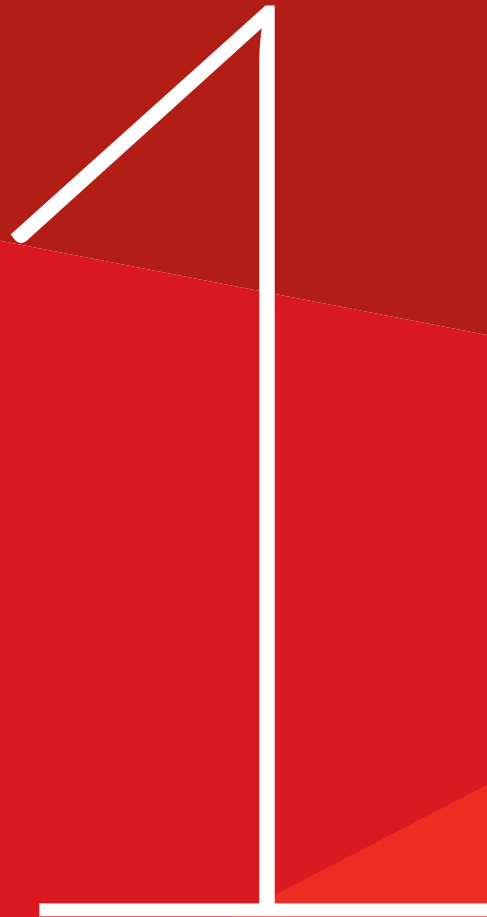
This workbook was designed to compliment instructor-led training. There are supplemental files needed to completely work through exercises and adequately learn concepts and skills gained by attending a PowerVision Configuration Studio® Software training class.



GETTING STARTED

“THE MEASURE OF A MAN IS WHAT
HE DOES WITH POWER.”

PLATO



Navigating Through PowerVision

Compatible Displays

File Structure

File Naming

Understanding Tabs

Uploading a Configuration

1.1 // First Things First

Supported Displays:

- PowerView Displays® (Monochrome & Color, Touch & Non-Touch)
- Controllers & I/O
- OEM Specific

Accessing & Saving Files

There are 3 main file structure types to be aware of:

- **.murphyConfig** - these are database files used to configure within PowerVision. They are created in the PowerVision software by using the Save and Save As functions. These files are automatically saved on the computer's local hard drive at: **Documents > Murphy Configurations > Version __ > DBs**
- **update.tar** - these file types create a package of the current configuration by using the Create function within PowerVision and can be saved where the user directs. These files are used to upload configurations to the display.
- **update-full.tar** - these file types are created by accessing the Tools and selecting Create Full Install. These files are used to create an install package with the configuration, OS and firmware. They can be saved where the user directs. These files are used to upload full installs onto the display.

It is important to note on the update.tar and updated-full.tar files that the prefix and suffix designations remain intact in order for the file to perform properly. You can assign a specific identifier to this file by adding a designation between the prefix and suffix as shown here:

update.myconfigname.tar

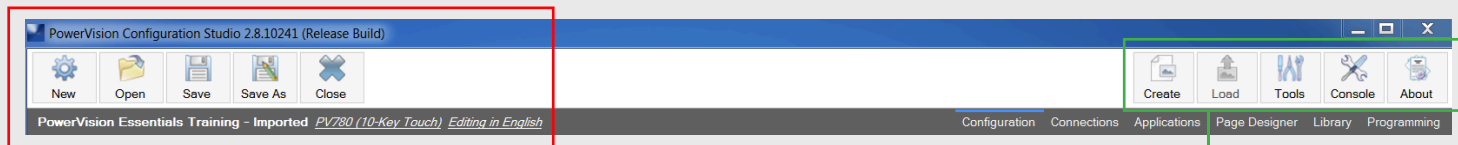
update-full.myconfigname.tar

1.2 // Navigating Through PowerVision

Let's load a configuration, and explore how to navigate through the software.

- ❑ On your flash drive open the .murphyConfig file: *PowerVision Essentials Training*

Main Navigation Bar



From the Main Navigation Bar you can:

- See what version of PowerVision you are using
- Create a new configuration
- Open a configuration
- Save a configuration
- Close the application
- Choose the display you want to configure
- Choose the language you want to edit in

- Create a configuration
- Load a configuration
- Within Tools you can:
 - Validate the current configuration
 - Create and Load Full install packages
 - Access Import / Export functions
 - Access search and diagnostic consoles
- Show / Hide the Console
- Show more about the Configuration Software

Configuration Tab

NewOpenSaveSave AsClose

CreateLoadToolsConsoleAbout

PowerVision Essentials Training - Imported PV780 (10-Key Touch) Editing in EnglishConfigurationConnectionsApplicationsPage DesignerLibraryProgramming

Configuration General Settings

Title:Training Configurations

Identifier:Blank Displays

Signature:8F51AC1F-76E2-4073-9205-3BA32EC317C2

Communicate over:Use HTTP ConduitConnection Timeout Not Connected

Backups:3backups will be stored in the backup folder

Options:Edit Languages...Edit Font Groups...Edit Culture Strings...Edit Security Options...

AvailableInstalled

Built With:2.8.102410.0

App:2.8.10314

OS:2.8.10013

Loader:N/A

Configuration Logos

0

1

2

3

4

MURPHY

Description and Notes:

Data Size

Config:0.0 kb

Strings:0.0 kb

Program:0.0 kb

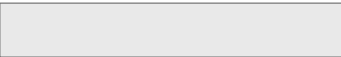
Screen:0.0 kb

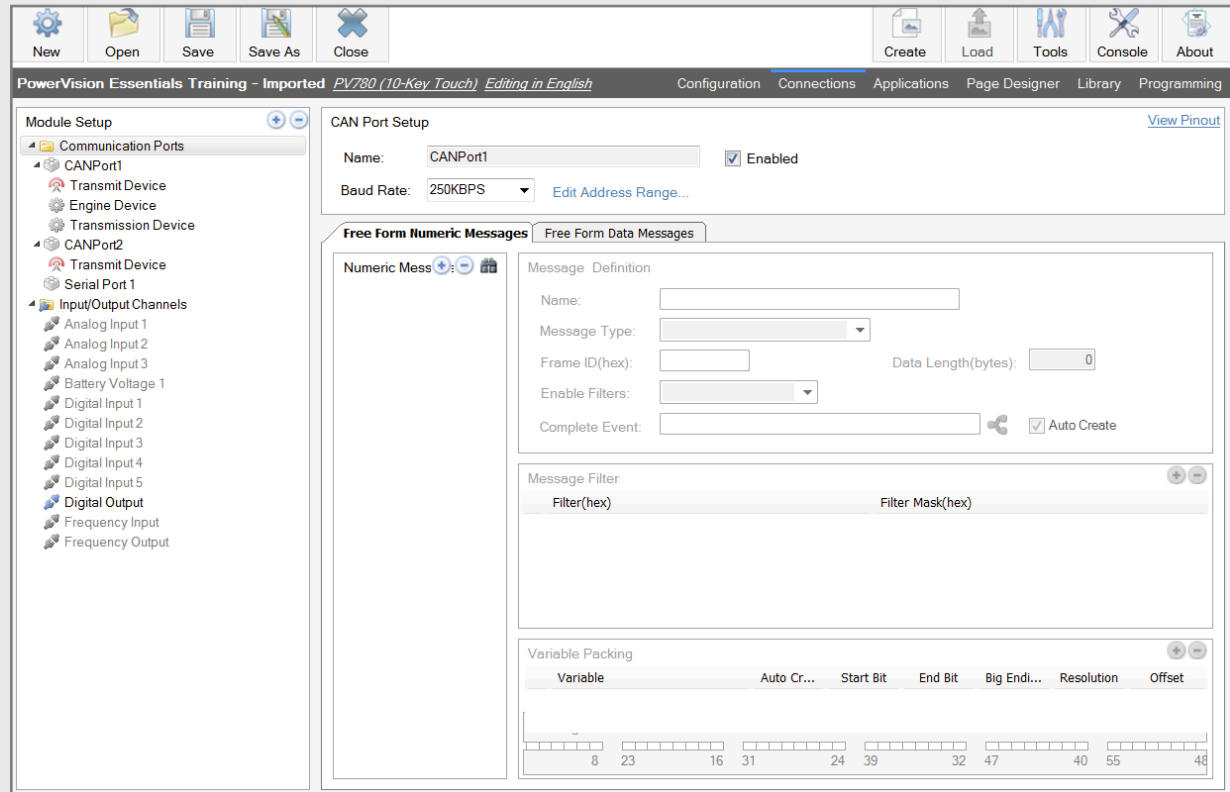
Fonts:0.0 kb

Images:0.0 kb

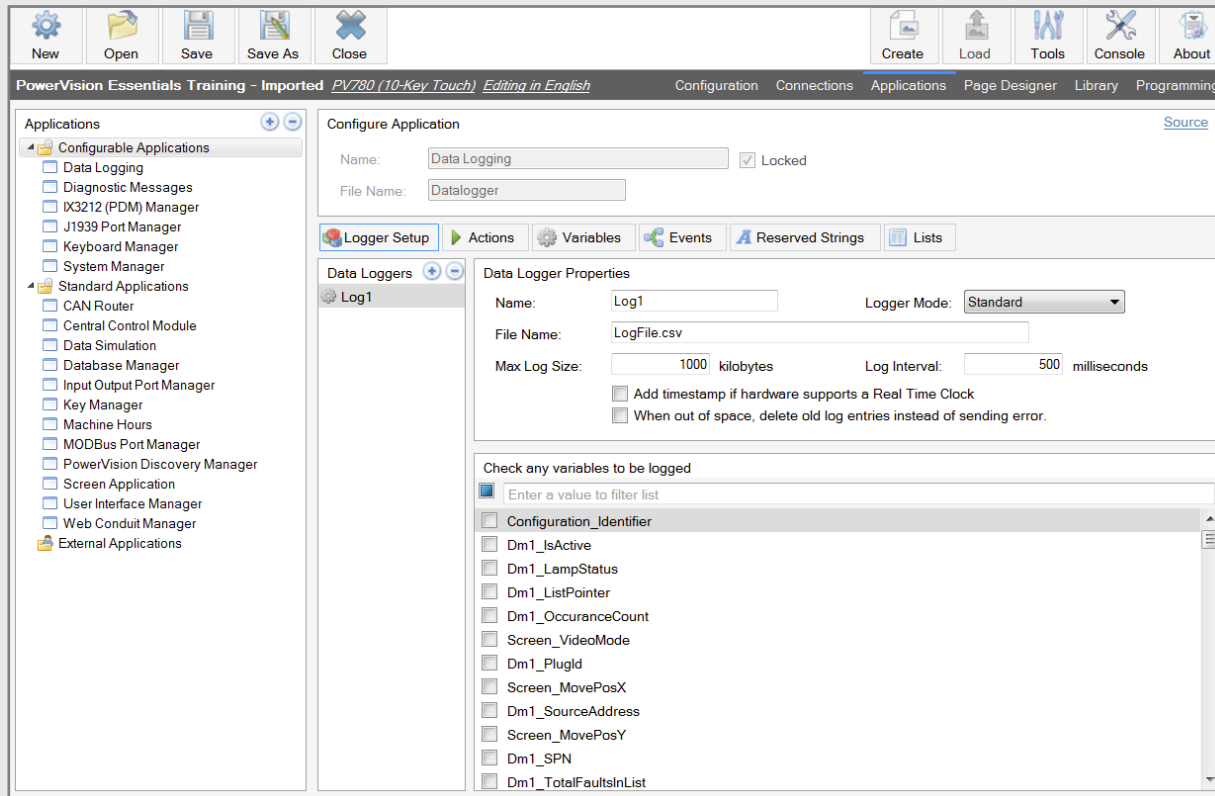
Bar is Max Capacity

Refresh

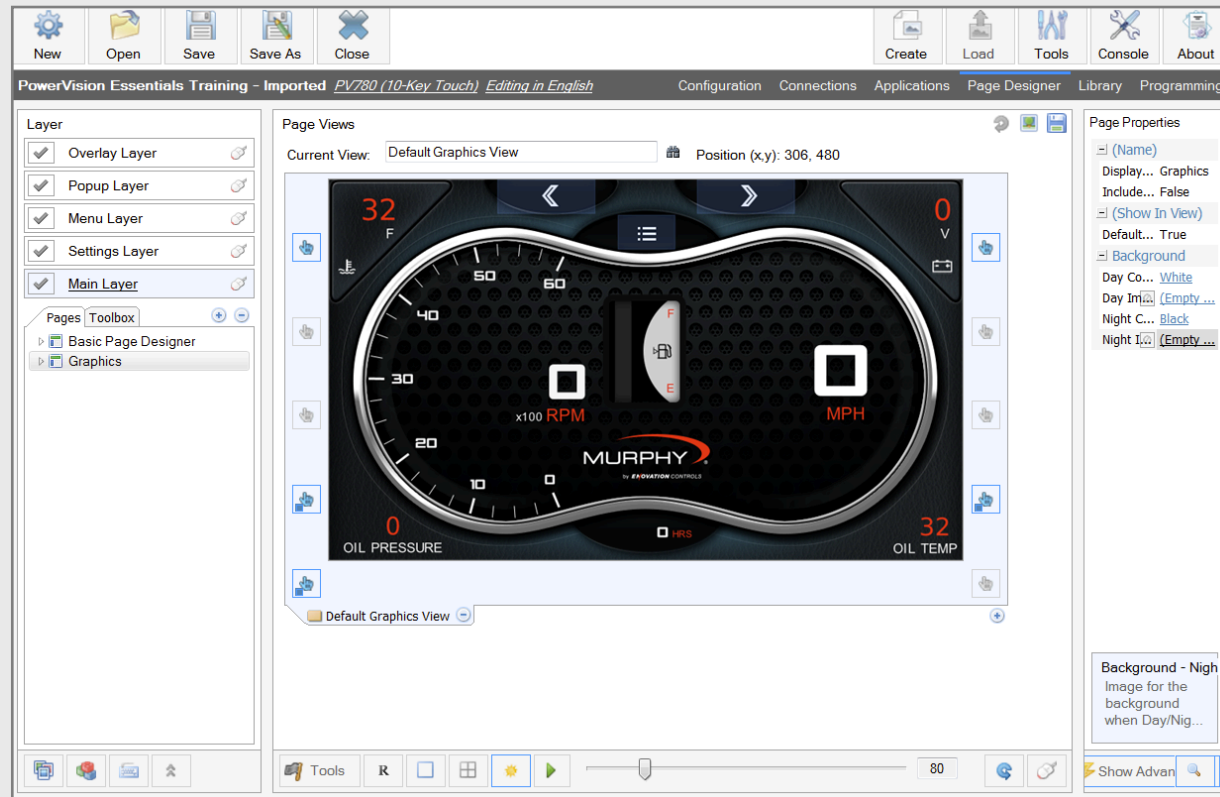




Applications Tab



Page Designer Tab



Library Tab

New

Open

Save

Save As

Close

Create

Load

Tools

Console

About

PowerVision Essentials Training - Imported PV780 (10-Key Touch) Editing in English

ConfigurationConnectionsApplicationsPage DesignerLibraryProgramming

J1939/NMEA ParametersDTC SetupPre Defined CurvesUnit ConversionIO DefinitionsCustomer Extensions

J1939/NMEA Parameter Groups

PGN	PGN (Hex)	Description	R...	Prio...	N...	Instanc...	Requ...	Fast Pa...
256	0x100	Transmission Control 1	50	3				
61442	0xF002	Electronic Transmission Controller 1	100	3				
61443	0xF003	Electronic Engine Controller 2	50	3				
61444	0xF004	Electronic Engine Controller 1	0	3				
61445	0xF005	Electronic Transmission Controller 2	100	6				
61448	0xF008	Hydraulic Pressure Governor Info	50	6				
64892	0xFD7C	Diesel Particulate Filter Control 1	1000	6				
65110	0xFE56	Aftertreatment 1 SCR Reagent Tank 1 Information	1000	6				
65128	0xFE68	Vehicle Fluids	1000	6				
65159	0xFE87	Ignition Timing 6	0	7			<input checked="" type="checkbox"/>	
65164	0xFE8C	Auxiliary Analog Information	0	7			<input checked="" type="checkbox"/>	
65213	0xFE8D	Fan Drive	1000	6				
65241	0xFED9	Auxiliary Input/Output Status 1	0	6				
65243	0xFEDB	Engine Fluid Level/Pressure 2	500	6				
65247	0xFEDF	Electronic Engine Controller 3	250	6				
65248	0xFEE0	Vehicle Distance	100	6			<input checked="" type="checkbox"/>	
65253	0xFEE5	Engine Hours, Revolutions	0	6			<input checked="" type="checkbox"/>	
65257	0xFEE9	Fuel Consumption (Liquid)	500	6			<input checked="" type="checkbox"/>	
65262	0xFEEE	Engine Temperature 1	1000	6				

Parameters

Long Name	Type	SPN	Start ... /	Start Bit	Byte Le...	Bit Length	Resolut...	Offset	Unit	Min Value	Max Value
Requested Gear	status	525	3	1	1	0	1	-125	state	-125	251

Programming Tab

PowerVision Essentials Training - Imported PV780 (10-Key Touch) Editing in English

Configuration Connections Applications Page Designer Library Programming

Programming Items

- CAN Router (5 items)
- Central Control Module (3 items)
- Data Logging (4 items)
- Data Simulation (3 items)
- Database Manager (1 items)
- Diagnostic Messages (69 items)
- Input Output Port Manager (1 items)
- J1939 Port Manager (104 items)
- Key Manager (1 items)
- ListItems (2 items)
- Machine Hours (1 items)
- MODBus Port Manager (20 items)
- Power Distribution Module Manager (1 items)
- Radio Manager (12 items)
- Screen Application (22 items)
- SmartData (3 items)
- SmartImage (3 items)
- System (3 items)
- System Manager (67 items)
- User Events (9 items)
- Web Conduit Manager (3 items)

Variables in Group

Name	Data Type	Initial Value	Can Save	Allow Invalid
CANPort1.Resistor	raw		1 DoNotSave	<input type="checkbox"/>
CANPort2.Resistor	raw		1 DoNotSave	<input type="checkbox"/>
CANPort1.BaudRate	raw		2 DoNotSave	<input type="checkbox"/>
CANPort3.BaudRate	raw		2 DoNotSave	<input type="checkbox"/>
CANPort2.BaudRate	raw		2 DoNotSave	<input type="checkbox"/>



BASIC PAGE DESIGNER

*“NEARLY ALL MEN CAN STAND ADVERSITY, BUT
IF YOU WANT TO TEST A MAN'S CHARACTER,
GIVE HIM POWER.”*

ABRAHAM LINCOLN

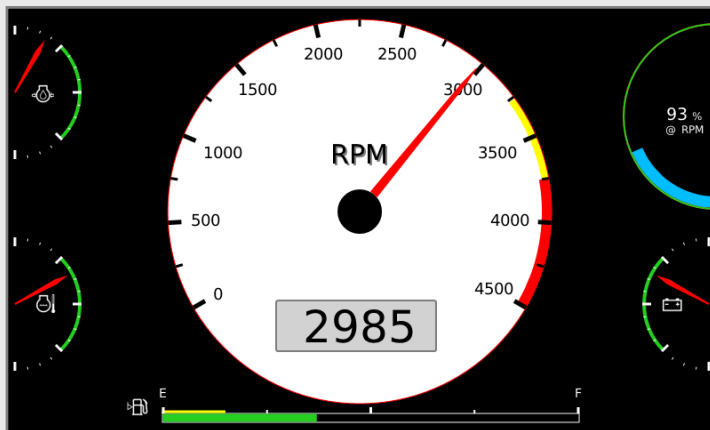


Navigating the Page Designer Tab
Using Proper Naming Conventions
Using Gauges and Widgets
Inputting J1939 Variables
Creating Pages
Changing Properties
Warning Zones
Visible Conditions
Changing Default Gauge Values
Saving Gauges to the Toolbox
Understanding Containers
Creating Page Navigation
Calculation Events

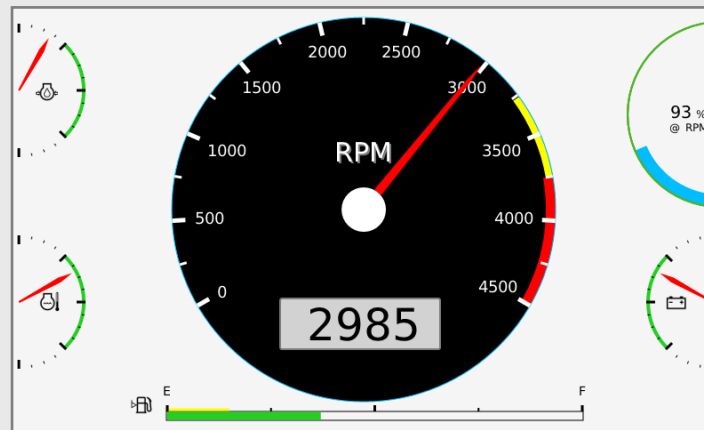
2.1 // Building an Engine Monitoring Page

Build an engine monitoring page based off the below criteria. When you have completed this section, you will have created an engine monitoring page like the one shown below.

MONITORING	Gauge TYPE	RANGE	UNITS	CRITICAL ZONES
Engine RPM	Rotary Gauge Text Gauge	0 - 4500	RPM	Warning: 3250 - 3750 (Yellow) Critical: 3750 - 4500 (Red)
Engine Oil Pressure	Rotary Gauge	0 - 300	PSI	Indicate Safe Range (Green)
Engine Coolant Temperature	Rotary Gauge	-40 - 410	°F	Indicate Safe Range (Green)
Battery Voltage	Rotary Gauge	0 - 36	V	Indicate Safe Range (Green)
Engine Load @RPM	Curved Bar Gauge Text Gauge	0 - 250	%	-
Engine Fuel Level	Bar Gauge	0 - 100	%	Warning: less than 15% (Yellow) when in warning zone: ISO Fuel Symbol change to red, fuel bar change from green to red



Day Mode



Night Mode

2.2 // Creating a New Configuration

- ❑ Open the PowerVision Configuration Studio software
- ❑ Click New
- ❑ Enter a name for your new configuration: *YourName - PowerVision Essentials Training*
- ❑ Click Create

Now we need to ensure that you are configuring the correct device.

- ❑ Click on PV780 (10-Key) to the right of your configuration's name in the upper left-hand side of the screen
- ❑ Select PowerView Displays > Change to PV780 (10-Key Touch)
- ❑ When the Device Mapping screen pops up, Click OK





Create a Configuration Page

- ❑ Click on the Page Designer tab
- ❑ In the Main Layer select Main Page

In the Page Properties:

- ❑ Change the Display Name to: *Basic Page Designer*
- ❑ Change the Day Color to Black
- ❑ Change the Night Color to White Smoke

Page Properties

[-] (Name)	
Display Name	Basic Page Designer
Include in Programming	False
[-] (Show In View)	
Basic Page Designer View	True
[-] Background	
Day Color	 Black
Day Image	 (Empty Image)
Night Color	 WhiteSmoke
Night Image	 (Empty Image)

2.3 // Inputting Variables

Now we need to add J1939 variables so we can map the gauges to them.

- ❑ Click on the Connections Tab
- ❑ In the Module Setup pane under CANPort1, select Engine Device
- ❑ With the J1939/NMEA Parameter Mapping tab selected, click the +

A list of variables will appear.

- ❑ Select the individual variables
- ❑ Click OK

The J1939 Mapped Variables list should now be populated.

- ❑ Go back to Page Designer tab

J1939/NMEA Parameter Mapping				DTC Mapping		DM Memory Mapping	
J1939 Mapped Variables							
PGN	Parameter	Selected Variable	Auto Cr...				
61444 (0xF004)	Engine Speed	J1939.Engine.Engine Speed	✓				
65263 (0xFEEF)	Engine Oil Pressure	J1939.Engine.Engine Oil Pressure	✓				
65262 (0xFEFE)	Engine Coolant Temperature	J1939.Engine.Engine Coolant Temperature	✓				
65271 (0xFE7)	Battery Potential Voltage	J1939.Engine.Battery Potential Voltage	✓				
61443 (0xF003)	Percent Load At Current Rpm	J1939.Engine.Percent Load At Current Rpm	✓				
65276 (0xFEFC)	Fuel Level	J1939.Engine.Fuel Level	✓				

2.4 // Using Gauges and Widgets

Create an Engine RPM Gauge

There are 4 components to creating this RPM gauge: a Rotary Gauge, Text Widget, Text Gauge and Rectangle Widget.

1. RPM Rotary Gauge (Supplemental 2.4.1 RPM Rotary Gauge)

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Rotary Gauge onto your screen
- ☐ Using Supplemental 2.4.1, change the Rotary Gauge Properties

2. RPM Text Widget (Supplemental 2.4.2 RPM Text Widget)

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Text Widget - MultiLanguage onto your screen
- ☐ Using Supplemental 2.4.2, change the Text Widget Properties

3. RPM Text Gauge (Supplemental 2.4.3 RPM Text Gauge)

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Text Gauge onto your screen
- ☐ Using Supplemental 2.4.3, change the Text Gauge Properties

4. RPM Rectangle Widget (Supplemental 2.4.4 RPM Rectangle Widget)

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Rectangle Widget onto your screen
- ☐ Using Supplemental 2.4.4, change the Rectangle Widget Properties

REMEMBER

Make sure to use proper naming conventions.

Make sure Show Advanced is selected at the bottom of the properties bar.

Specify both day and night properties.

Put each of your gauge elements into groups, and it will be easier to manage as you build your configuration.

Supplemental 2.4.1 RPM Rotary Gauge

Rotary Gauge Properties

[-] (Name)

Display Name

RG RPM

Group

RPM

Include in Programming

False

[-] (Position)

(Designer Locked)

True

Show Touched

False

X Position

193

Y Position

41

Width

432

Height

432

Rotation

0

Rotation Pin X

0

Rotation Pin Y

0

[-] (Show In View)

Basic Page Designer View

True

[-] (Touch Actions)

Touch Action

[\(Not Mapped\)](#)

Touch Action - Start

[\(Not Mapped\)](#)

Touch Action - Continue

[\(Not Mapped\)](#)

Touch Action - Release

[\(Not Mapped\)](#)

[-] Advanced Features

Visible Condition

[Condition Disabled...](#)

Background Primitives

[Edit Primitives...](#)

Foreground Primitives

[Edit Primitives...](#)

Warning Zones

[Edit Zones...](#)

[-] Background

(Background Enabled)

True

Fill Day

☐ [White](#)

Fill Night

☒ [Black](#)

Outline Day

☒ [Red](#)

Outline Night

☒ [DeepSkyBlue](#)

[-] Data

Variable

[11939 Engine Engine Speed](#)

Variable Unit

[RPM](#)

Minimum Value

0.

Maximum Value

4500.

Smoothing

1.

[-] Data Error

Day Blend Color

☐ [LightGray](#)

Night Blend Color

☐ [LightGray](#)

[-] Hub

Day Color

☒ [Black](#)

Night Color

☐ [White](#)

Radius

25

[-] Image

Day

☐ [\(Empty Image\)](#)

Night

☐ [\(Empty Image\)](#)

X Position

0

Y Position

50

[-] Needle

Length - Inside

160

- Outside

23

Width - Base

10

- Middle

5

- End

1

Day Color

☒ [Red](#)

Night Color

☒ [Red](#)

[-] Tick Marks

Angle - Start

210

- End

-30

Value - Start

0

- End

4500

Major - Number

10

- Length

15

- Width

5

Minors - Number

1

- Length

8

- Width

3

Day Color

☒ [Black](#)

Night Color

☐ [White](#)

[-] Tick Text

Font Group

[Default Font Group](#)

Font Height

18

Center Text

False

Distance From Mark

10

Day Color

☒ [Black](#)

Night Color

☐ [White](#)

[-] Unit Text

Unit Text

Font Group

[Default Font Group](#)

Font Height

20

Distance From Center

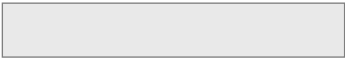
10

Day Color

☒ [Black](#)

Night Color

☒ [Black](#)



Supplemental 2.4.2 RPM Text Widget



Text Widget Properties	
(Name)	
Display Name	TW RPM
Group	RPM
Include in Programming	False
(Position)	
(Designer Locked)	True
Show Touched	False
X Position	353
Y Position	304
Width	111
Height	41
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
(Show In View)	
Basic Page Designer View	True
(Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
Advanced Features	
Visible Condition	Condition Disabled...
List Binding	Binding Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
Override String	(Not Mapped)
Display Text	
Text String	RPM
Font Group	Default Font Group
Font Height	30
Vertical Alignment	Bottom
Horizontal Alignment	Center
Word Wrap	True
Clip	False
AutoScroll Text	False
Day Color	<input checked="" type="checkbox"/> Black
Night Color	<input type="checkbox"/> White
Drop Shadow	
Show Shadow	True
Shadow Color	<input checked="" type="checkbox"/> Gray
Shadow X Offset	2
Shadow Y Offset	2

Supplemental 2.4.3 RPM Text Gauge

Text Gauge Properties

-| (Name)

Display Name

TG RPM

Group

RPM

Include in Programming

False

-| (Position)

(Designer Locked)

False

Show Touched

False

X Position

341

Y Position

98

Width

132

Height

54

Rotation

0

Rotation Pin X

0

Rotation Pin Y

0

-| (Show In View)

Basic Page Designer View

True

-| (Touch Actions)

Touch Action

(Not Mapped)

Touch Action - Start

(Not Mapped)

Touch Action - Continue

(Not Mapped)

Touch Action - Release

(Not Mapped)

-| Advanced Features

Visible Condition

Condition Disabled...

List Binding

Binding Disabled...

-| Data

Variable

J1939 Engine Engine Speed

Variable Unit

RPM

Minimum Value

0.

Maximum Value

4500.

Smoothing

1.

Decimal Places

0

Display Format

Decimal

Divided By

1.

Leading Zeros

0

Smallest Increment

1.

-| Data Error

Day Blend Color

LightGray

Night Blend Color

LightGray

-| Display Text

Font Group

Default Font Group

Font Height

50

Vertical Alignment

Bottom

Horizontal Alignment

Right

Day

Black

Night

Black

-| Drop Shadow

Show Shadow

False

Shadow Color

Gray

Shadow X Offset

5

Shadow Y Offset

5

-| Unit Text

Text String

Font Group

Default Font Group

Font Height

20

Day Color

White




Night Color

Black



Supplemental 2.4.4 RPM Rectangle Widget



Rectangle Widget Properties	
(Name)	
Display Name	RW RPM
Group	RPM
Include in Programming	False
(Position)	
(Designer Locked)	False
Show Touched	False
X Position	315
Y Position	100
Width	180
Height	57
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
(Show In View)	
Basic Page Designer View	True
(Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
Advanced Features	
Visible Condition	Condition Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
Drawing	
Drawing Mode	All Modes
Fill	
Style	Solid
Start Color	 LightGray
End Color	 DimGray
Gradient Angle	0
Radial X Offset	0
Radial Y Offset	0
Radial Center X	0
Radial Center Y	0
Radial Radius	0
Outline	
Color	 Gray
Corner Radius	2
Width	2

Create an Engine Load @RPM Gauge

There are 4 components to creating this Load @RPM gauge: a Curved Bar Gauge, Ellipse Widget, Text Gauge and Text Widget.

1. Load @RPM Curved Bar Gauge *(Supplemental 2.4.5 Load @RPM Curved Bar Gauge)*

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Curved Bar Gauge onto your screen
- ☐ Using Supplemental 2.4.5, change the Curved Bar Gauge Properties

2. Load @RPM Ellipse Widget *(Supplemental 2.4.6 Load @RPM Ellipse Widget)*

- ☐ Click on the Toolbox tab
- ☐ Click and drag an Ellipse Widget onto your screen
- ☐ Using Supplemental 2.4.6, change the Ellipse Widget Properties

3. Load @RPM Text Gauge *(Supplemental 2.4.7 Load @RPM Text Gauge)*

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Text Gauge onto your screen
- ☐ Using Supplemental 2.4.7, change the Text Gauge Properties

4. Load @RPM Text Widget *(Supplemental 2.4.8 Load @RPM Text Widget)*

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Text Widget - MultiLanguagev onto your screen
- ☐ Using Supplemental 2.4.8, change the Text Widget Properties

REMEMBER

Use proper naming conventions.

Make sure Show Advanced is selected at the bottom of the properties bar.

Specify both day and night properties.

Put each of your gauge elements into groups and it will be easier to manage as you build your configuration.

Supplemental 2.4.5 Load @RPM Curved Bar Gauge

Curved Bar Gauge Properties	
(Name)	
Display Name	CBG Load
Group	Load
Include in Programming	False
(Position)	
(Designer Locked)	False
Show Touched	False
X Position	697
Y Position	251
Width	206
Height	208
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
(Show In View)	
Basic Page Designer View	True
(Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
Advanced Features	
Visible Condition	Condition Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
Background	
Fill Day	<input type="checkbox"/> Transparent
Fill Night	<input type="checkbox"/> Transparent
Outline Day	<input type="checkbox"/> Transparent
Outline Night	<input type="checkbox"/> Transparent
Data	
Variable	J1939 Engine Percent Load At C...
Variable Unit	%
Minimum Value	0.
Maximum Value	250.
Smoothing	0.5
Data Error	
Day Blend Color	<input type="checkbox"/> LightGray
Night Blend Color	<input type="checkbox"/> LightGray
Display Bar	
Gauge Style	Circle Right
Inside Radius	90
Angle - Start	270
Angle - End	90
Day Color	<input checked="" type="checkbox"/> DeepSkyBlue
Night Color	<input checked="" type="checkbox"/> DeepSkyBlue

Supplemental 2.4.6 Load @RPM Ellipse Widget

Ellipse Widget Properties

- (Name)

Display Name	EW Load Green
Group	Load
Include in Programming	False

- (Position)

(Designer Locked)	False
Show Touched	False
X Position	696
Y Position	252
Width	208
Height	208
Rotation	0
Is Circle	False
Rotation Pin X	0
Rotation Pin Y	0

- (Show In View)

Basic Page Designer View	True
--------------------------	------

- (Touch Actions)

Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)

- Advanced Features

Visible Condition	Condition Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...

- Drawing

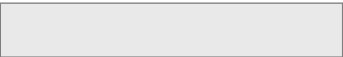
Drawing Mode	All Modes
--------------	-----------

- Fill

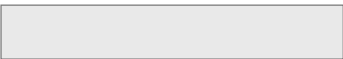
Style	Solid
Start Color	<input type="checkbox"/> Transparent
End Color	<input checked="" type="checkbox"/> CornflowerBlue
Gradient Angle	0
Radial X Offset	0
Radial Y Offset	0
Radial Center X	0
Radial Center Y	0
Radial Radius	0

- Outline

Color	<input checked="" type="checkbox"/> LimeGreen
Width	2



Supplemental 2.4.7 Load @RPM Text Gauge



Text Gauge Properties

[-] (Name)

Display NameTG Load

GroupLoad

Include in ProgrammingFalse

[-] (Position)

(Designer Locked)False

Show TouchedFalse

X Position713

Y Position348

Width55

Height30

Rotation0

Rotation Pin X0

Rotation Pin Y0

[-] (Show In View)

Basic Page Designer ViewTrue

[-] (Touch Actions)

Touch Action(Not Mapped)

Touch Action - Start(Not Mapped)

Touch Action - Continue(Not Mapped)

Touch Action - Release(Not Mapped)

[-] Advanced Features

Visible ConditionCondition Disabled...

List BindingBinding Disabled...

[-] Data

VariableJ1939 Engine Percent Load At C...

Variable Unit%

Minimum Value0.

Maximum Value250.

Smoothing1.

Decimal Places0

Display FormatDecimal

Divided By1.

Leading Zeros0

Smallest Increment1.

[-] Data Error

Day Blend ColorLightGray

Night Blend ColorLightGray

[-] Display Text

Font GroupDefault Font Group

Font Height19

Vertical AlignmentBottom

Horizontal AlignmentRight

DayWhite

NightBlack

[-] Drop Shadow

Show ShadowFalse

Shadow ColorGray

Shadow X Offset5

Shadow Y Offset5

[-] Unit Text

Text String%

Font GroupDefault Font Group

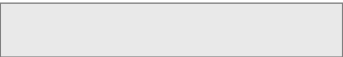
Font Height12

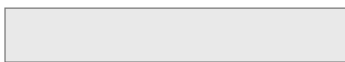
Day ColorWhite

Night ColorBlack

Supplemental 2.4.8 Load @RPM Text Widget

Text Widget Properties	
- (Name)	
Display Name	TW Load @ RPM
Group	Load
Include in Programming	False
- (Position)	
(Designer Locked)	False
Show Touched	False
X Position	729
Y Position	334
Width	57
Height	21
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
- (Show In View)	
Basic Page Designer View	True
- (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
- Advanced Features	
Visible Condition	Condition Disabled...
List Binding	Binding Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
Override String	(Not Mapped)
- Display Text	
Text String	@ RPM
Font Group	Default Font Group
Font Height	12
Vertical Alignment	Bottom
Horizontal Alignment	Right
Word Wrap	True
Clip	False
AutoScroll Text	False
Day Color	<input type="checkbox"/> White
Night Color	<input checked="" type="checkbox"/> Black
- Drop Shadow	
Show Shadow	False
Shadow Color	<input checked="" type="checkbox"/> Gray
Shadow X Offset	5
Shadow Y Offset	5





Create an Engine Fuel Level Gauge

There are 4 components to creating this Engine Fuel Level gauge: a Bar Gauge, an Image Widget and two Text Widgets.

1. Bar Gauge (*Supplemental 2.4.9 Fuel Bar Gauge*)

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Bar Gauge onto your screen
- ☐ Using Supplemental 2.4.9, change the Bar Gauge Properties

2. Image Widget (*Supplemental 2.4.10 Fuel Image Widget*)

- ☐ Click on the Toolbox tab
- ☐ Click and drag an Image Widget onto your screen
- ☐ Using Supplemental 2.4.10, change the Image Widget Properties

3. Text Widget (*Supplemental 2.4.11 Fuel Text Widget_E*)

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Text Widget - MultiLanguage onto your screen for the E
- ☐ Using Supplementals 2.4.11 change the Text Widget Properties

4. Text Widget (*Supplemental 2.4.12 Fuel Text Widget_F*)

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Text Widget - MultiLanguage onto your screen for the F
- ☐ Using Supplementals 2.4.12 change the Text Widget Properties

Supplemental 2.4.9 Fuel Bar Gauge

Bar Gauge Properties

[-] (Name)

Display Name

BG Fuel

Group

Fuel

Include in Programming

False

[-] (Position)

(Designer Locked)

True

Show Touched

False

X Position

177

Y Position

12

Width

469

Height

10

Rotation

0

Rotation Pin X

0

Rotation Pin Y

0

[-] (Show In View)

Basic Page Designer View

True

[-] (Touch Actions)

Touch Action

(Not Mapped)

Touch Action - Start

(Not Mapped)

Touch Action - Continue

(Not Mapped)

Touch Action - Release

(Not Mapped)

[-] Advanced Features

Visible Condition

Condition Disabled...

Background Primitives

Edit Primitives...

Foreground Primitives

Edit Primitives...

Warning Zones

Edit Zones...

[-] Background

(Enabled)

True

Fill Day

☐ Transparent

Fill Night

☐ Transparent

Outline Day

☐ White

Outline Night

☒ Black

[-] Data

Variable

11939 Engine Fuel Level

Variable Unit

%

Minimum Value

0.

Maximum Value

100.

Smoothing

1.

[-] Data Error

Day Blend Color

☐ LightGray

Night Blend Color

☐ LightGray

[-] Display Bar

Gauge Style

Sweep Right | Ticks Above

Day Color

☒ LimeGreen

Night Color

☒ LimeGreen

Day Image

☐ (Empty Image)

Night Image

☐ (Empty Image)

[-] Tick Marks

Majors - Number

3

- Length

7

- Width

3

Minors - Number

1

- Length

4

- Width

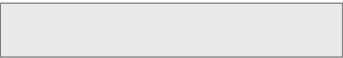
2

Day Color

☐ White

Night Color

☒ Black



Supplemental 2.4.10 Fuel Image Widget

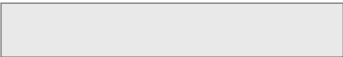


Image Widget Properties

[-] (Name)

Display Name	IW Fuel
Group	Fuel
Include in Programming	False

[-] (Position)

(Designer Locked)	True
Show Touched	False
X Position	136
Y Position	17
Width	25
Height	25
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0

[-] (Show In View)

Basic Page Designer View	True
--------------------------	------

[-] (Touch Actions)

Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)

[-] Advanced Features

Visible Condition	Condition Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...

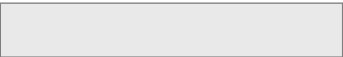
[-] Image

Day Image	<input type="checkbox"/> Fuel level
Night Image	<input checked="" type="checkbox"/> Fuel level
Stretch Image	False

NOTE
Duplicate and Colorize Image.

Supplemental 2.4.11 Fuel Text Widget_E

Text Widget Properties	
[-] (Name)	
Display Name	TW Fuel E
Group	Fuel
Include in Programming	False
[-] (Position)	
(Designer Locked)	True
Show Touched	False
X Position	173
Y Position	37
Width	21
Height	25
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
[-] (Show In View)	
Basic Page Designer View	True
[-] (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
[-] Advanced Features	
Visible Condition	Condition Disabled...
List Binding	Binding Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
Override String	(Not Mapped)
[-] Display Text	
Text String	E
Font Group	Default Font Group
Font Height	14
Vertical Alignment	Bottom
Horizontal Alignment	Left
Word Wrap	True
Clip	False
AutoScroll Text	False
Day Color	<input type="checkbox"/> White
Night Color	<input checked="" type="checkbox"/> Black
[-] Drop Shadow	
Show Shadow	False
Shadow Color	<input checked="" type="checkbox"/> Gray
Shadow X Offset	5
Shadow Y Offset	5



Supplemental 2.4.12 Fuel Text Widget_F



Text Widget Properties	
[-] (Name)	
Display Name	TW Fuel F
Group	Fuel
Include in Programming	False
[-] (Position)	
(Designer Locked)	True
Show Touched	False
X Position	641
Y Position	37
Width	21
Height	25
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
[-] (Show In View)	
Basic Page Designer View	True
[-] (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
[-] Advanced Features	
Visible Condition	Condition Disabled...
List Binding	Binding Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
Override String	(Not Mapped)
[-] Display Text	
Text String	F
Font Group	Default Font Group
Font Height	14
Vertical Alignment	Bottom
Horizontal Alignment	Left
Word Wrap	True
Clip	False
AutoScroll Text	False
Day Color	<input type="checkbox"/> White
Night Color	<input checked="" type="checkbox"/> Black
[-] Drop Shadow	
Show Shadow	False
Shadow Color	<input checked="" type="checkbox"/> Gray
Shadow X Offset	5
Shadow Y Offset	5

2.5 // Creating Warning Zones

Now we need to create a Warning Zone for the RPM Gauge and for when the Fuel Level drops below 15%.

❑ In the Pages Tab select the RG RPM gauge (it should be in the RPM folder)

In the properties bar, under Advanced Features > Warning Zones

❑ Select Edit Zones

The Zone Editor Window will appear

❑ Click the + and change the Zone Properties

❑ Create for Warning Zone (Yellow)

❑ Click the + and change the Zone Properties

❑ Create for Critical Zone (Red)

Now follow this same process to create your warning zone for the fuel level gauge.

❑ BG Fuel Gauge

Zone Properties

Inner Radius:

208

Start Angle:

36

Outer Radius:

216

End Angle:

10

Background Colors

Day:

Night:

Zone Properties

Inner Radius:

205

Start Angle:

10

Outer Radius:

216

End Angle:

-30

Background Colors

Day:

Night:

Zone Properties

Min:

0

Max:

15

Size:

2

Background Colors

Day:

Night:

TIP

When creating warning zones on a Rotary Gauge start with the outer radius vs. the inner radius to determine correct placement.

Use your tick marks angle to determine the angle of your zone.

In the properties bar, the tick marks end angle is -30. This is the end angle for the Critical Zone here.

The start angle of the Critical Zone is the same as the End Angle for the Warning Zone.

2.6 // Creating a Visible Condition

Due to how we want the Fuel Level Gauge to function (ref. Section 2.1), we need to create duplicates of the Bar Gauge and Image Widget and have them appear under a *Visible Condition* when the Fuel Level drops below 15%.

Duplicate the Bar Gauge.

- ☐ Select the BG Fuel gauge in the Pages tab
- ☐ Copy and Paste the BG Fuel gauge
- ☐ Rename the new / copied gauge to: *BG Fuel Low*

In the properties bar: (*Supplemental 2.6.1 Fuel Low Bar Gauge*)

- ☐ Change the X & Y Position for the BG Fuel Low gauge to be the same as the BG Fuel gauge
- ☐ Change both the Day & Night Colors of the BG Fuel Low gauge to Red

Duplicate the Image Widget

- ☐ Select the IW Fuel gauge in the Pages tab
- ☐ Copy and Paste the IW Fuel gauge
- ☐ Rename the new / copied gauge to: *IW Fuel Low*

In the properties bar: (*Supplemental 2.6.2 Fuel Image Widget*)

- ☐ Change the X & Y Position for the IW Fuel Low gauge to be the same as the IW Fuel gauge
- ☐ Change both the Day & Night Image for the IW Fuel Low gauge to be a Red image

NOTE

When you use the paste function within PowerVision, it places your object 10 pixels to the right on the X axis.

The Y value of the object stays the same.

REMEMBER

Do not change the color of an image unless you first make a duplicate.

Supplemental 2.6.1 Fuel Low Bar Gauge

Bar Gauge Properties

[-] (Name)

Display Name

BG Fuel Low

Group

Fuel

Include in Programming

False

[-] (Position)

(Designer Locked)

True

Show Touched

False

X Position

177

Y Position

12

Width

469

Height

10

Rotation

0

Rotation Pin X

0

Rotation Pin Y

0

[-] (Show In View)

Basic Page Designer View

True

[-] (Touch Actions)

Touch Action

(Not Mapped)

Touch Action - Start

(Not Mapped)

Touch Action - Continue

(Not Mapped)

Touch Action - Release

(Not Mapped)

[-] Advanced Features

Visible Condition

[Condition Enabled...](#)

Background Primitives

[Edit Primitives...](#)

Foreground Primitives

[Edit Primitives...](#)

Warning Zones

[Edit Zones...](#)

[-] Background

(Enabled)

True

Fill Day

☐ [Transparent](#)

Fill Night

☐ [Transparent](#)

Outline Day

☐ [White](#)

Outline Night

☒ [Black](#)

[-] Data

Variable

[11939 Engine Fuel Level](#)

Variable Unit

[%](#)

Minimum Value

0.

Maximum Value

100.

Smoothing

1.

[-] Data Error

Day Blend Color

☐ [LightGray](#)

Night Blend Color

☐ [LightGray](#)

[-] Display Bar

Gauge Style

Sweep Right | Ticks Above

Day Color

☒ [Red](#)

Night Color

☒ [Red](#)

Day Image

☐ [\(Empty Image\)](#)

Night Image

☐ [\(Empty Image\)](#)

[-] Tick Marks

Majors - Number

3

- Length

7

- Width

3

Minors - Number

1

- Length

4

- Width

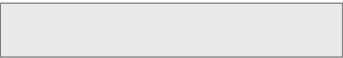
2

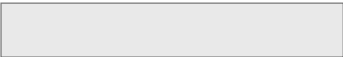
Day Color

☐ [White](#)


Night Color

☒ [Black](#)





Supplemental 2.6.2 Fuel Image Widget

Image Widget Properties	
[-] (Name)	
Display Name	IW Fuel Low
Group	Fuel
Include in Programming	False
[-] (Position)	
(Designer Locked)	True
Show Touched	False
X Position	136
Y Position	17
Width	25
Height	25
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
[-] (Show In View)	
Basic Page Designer View	True
[-] (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
[-] Advanced Features	
Visible Condition	Condition Enabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
[-] Image	
Day Image	 Fuel level
Night Image	 Fuel level
Stretch Image	False

Create a Visible Condition for Fuel Level

- ☐ Select the BG Fuel gauge in the Pages tab
- ☐ In the properties bar, select to enable Visible Condition under the Advanced Features section

The Visible Condition Setup window will appear.

- ☐ Complete the Visible Condition Setup

REMEMBER

Make sure Show Advanced is selected at the bottom of the properties bar.

Repeat these steps to complete the Visible Condition Setup for:

- ☐ BG Fuel Low gauge
- ☐ IW Fuel widget
- ☐ IW Fuel Low widget

☒ Enable Visible Condition Checking

☒ Use Variable: [J1939 Engine Fuel Level](#)
Unit: %

☐ Use List: [\(None\)](#)

Data from a numeric variable or a numeric list value can be used to determine item visibility

Range Checking

Min: Max:

☐ Include Max Value in range check (\leq vs $<$)

☐ Show This Item When Data is Invalid

☐ Show When No Other Condition is in Range

☐ Always Show In Page Designer

Use for: **BG Fuel Low** gauge and **IW Fuel Low** widget

☒ Enable Visible Condition Checking

☒ Use Variable: [J1939 Engine Fuel Level](#)
Unit: %

☐ Use List: [\(None\)](#)

Data from a numeric variable or a numeric list value can be used to determine item visibility

Range Checking

Min: Max:

☒ Include Max Value in range check (\leq vs $<$)

☐ Show This Item When Data is Invalid

☐ Show When No Other Condition is in Range

☒ Always Show In Page Designer

Use for: **BG Fuel** gauge and **IW Fuel** widget

Bonus:

Try Creating a visible condition for the Load @ RPM Gauge, so that when the Load is:

- ☐ Below 75%, the Ellipse Widget is Green
- ☐ Above 75%, the Ellipse Widget is Red

2.7 // Understanding Containers and the Toolbox

Creating a Container

Using and understanding containers is similar to using and understanding grouping objects in most editing / design applications. There are three ways to generate a Container:

- **Click the Container Templates icon at the bottom left of the Page Designer Tab.**

This will cause the Edit Container Widget window to appear. From here you can drag gauges and widgets onto the container's design canvas and build within the container.



- **Drag a Container Widget from the Toolbox onto the design canvas.**

This will put a container onto the canvas. Double click the container and it will open a window called: Edit Container Widget. From here you can drag gauges and widgets onto the container's design canvas and build within the container.

- **Select multiple objects > right click > select Group.**

This will put those selected objects into a container. You can then double click that container to open the Edit Container Widget window

Disassembling a Container

The easiest way to undo a container is from the Page Designer Tab. Select the container > right click > select Ungroup

Note:

- Containers have their own properties
- You can use Containers in programming
- You can save a container in the Toolbox to access later

Using the Toolbox

The Toolbox allows users to change default gauge and widget properties as well as create and save gauges and widgets that can be accessed from the Toolbox.

To access the Toolbox, click on the Toolbox icon at the bottom left of the Page Designer Tab.



Now let's walk through:

Changing Default Gauges and Widgets:

Saving Your Own Gauges and Widgets:

Grouping within the Toolbox:



2.8 // Using Smart Gauges and Widgets

Now we are going to create gauges to monitor Engine Oil Pressure, Engine Coolant Temperature and Battery Voltage. The gauges look the same from a design perspective so we can use a Smart Rotary Gauge and a Smart Image Widget to create all three gauges.

- ☐ Click and drag a Smart Rotary Gauge onto your screen
- ☐ Name this gauge: *SRG Oil Pressure*
- ☐ Group: *Oil Pressure*

Don't worry about changing any of the properties at this point, we need to input our criteria for each gauge first. In the properties bar, under the Advanced Features section:

- ☐ Select Edit Smart Data


The Smart Data Editor window will appear.

REMEMBER

Make sure Show Advanced is selected at the bottom of the properties bar.

- ☐ Check the box that says Auto Create (this creates a variable within the configuration that the system can call upon)
- ☐ Click the + sign and select Engine Oil Pressure
- ☐ Click OK
- ☐ Click the + sign and select Engine Coolant Temperature
- ☐ Click OK
- ☐ Click the + sign and select Battery Voltage
- ☐ Click OK
- ☐ Change the properties to match our criteria (ref. Section 2.1)

Gauge Data Selector Variable

Selector Variable:  ☒ Auto Create

Variable List

Selector	Mapped Variable	Display Unit	Label	Day Image	Night Image	Majors	Minors	Min	Max	Tick Min	Tick Max
0	J1939.Engine.Engine Oil Pressure	psi	(Empty)			5	3	0.00	300.00	0	300
1	J1939.Engine.Engine Coolant Temperature	F	(Empty)			5	3	-40.00	410.00	-40	410
2	J1939.Engine.Battery Potential Voltage	V	(Empty)			5	3	0.00	36.00	0	36

- ☐ Once you have changed all the properties, Click OK

Now it's time to use the properties bar to edit the gauge properties.

- ☐ Using **Supplemental 2.8.1** change the SRG Oil Pressure Properties
- ☐ Edit your Warning Zones to indicate the safe operating range

Now, let's use a Smart Image Widget to create icons for each of our gauges.

- ☐ Click and drag a Smart Image Widget onto your screen
- ☐ Name this widget: *SIW Oil Pressure*
- ☐ Group: *Oil Pressure*

In the properties bar

- ☐ Select Edit Smart Data

The Smart Data Editor window will appear.

- ☐ Check the box that says Auto Create
- ☐ Click the + sign
- ☐ For the Day Image, select the white Oil Pressure icon from the Image Library
- ☐ Click OK

- ☐ Create a black Oil Pressure icon and use this for the Night Image
- ☐ Click OK

- ☐ Repeat these steps to add Engine Coolant Temperature and Battery Voltage icons

- ☐ In the properties bar of SIW Oil Pressure set the X & Y position values:

X Position: 30


Y Position: 369


Zone Properties

Inner Radius: Start Angle:

Outer Radius: End Angle:

Background Colors

Day: 

Night: 

REMEMBER

Do not change the color of an image unless you first make a duplicate.

Image Widget Selector Variable








Selector Variable:  ☒ Auto Create

Image List

Selector ID	Day Image	Night Image
0		
1		
2		

Supplemental 2.8.1

Smart Rotary Gauge Properties	
(Name)	
Display Name	SRG Oil Pressure
Group	Oil Pressure
(Position)	
(Designer Locked)	False
Show Touched	False
X Position	-64
Y Position	308
Width	150
Height	150
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
(Show In View)	
Basic Page Designer View	True
(Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
Advanced Features	
Visible Condition	Condition Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
Smart Data Items	Edit Smart Data...
Warning Zones	Edit Zones...
Background	
(Background Enabled)	True
Fill Day	<input type="checkbox"/> Transparent
Fill Night	<input type="checkbox"/> Transparent
Outline Day	<input type="checkbox"/> Transparent
Outline Night	<input type="checkbox"/> Transparent
Data	
Smoothing	0.8
Data Error	
Day Blend Color	<input type="checkbox"/> LightGray
Night Blend Color	<input type="checkbox"/> LightGray
Hub	
Day Color	<input type="checkbox"/> Transparent
Night Color	<input type="checkbox"/> Transparent
Radius	0
Image	
X Position	0
Y Position	0

Needle	
Length - Inside	52
- Outside	16
Width - Base	2
- Middle	6
- End	0
Day Color	<input checked="" type="checkbox"/> Red
Night Color	<input checked="" type="checkbox"/> Red
Tick Marks	
Angle - Start	90
- End	-90
Majors - Length	10
- Width	3
Minors - Length	3
- Width	1
Day Color	<input type="checkbox"/> White
Night Color	<input checked="" type="checkbox"/> Black
Tick Text	
Font Group	Default Font Group
Font Height	14
Center Text	False
Distance From Mark	5
Day Color	<input type="checkbox"/> Transparent
Night Color	<input type="checkbox"/> Transparent
Unit Text	
Font Group	Default Font Group
Font Height	14
Distance From Center	25
Day Color	<input type="checkbox"/> Transparent
Night Color	<input type="checkbox"/> Transparent

Now we are going to duplicate the SRG Oil Pressure and the SIW Oil Pressure to create gauges for Coolant Temperature and Battery Voltage.

Coolant Temperature

- ☐ Select the SRG Oil Pressure gauge
- ☐ Copy and Paste it onto your screen
- ☐ Rename this new gauge: *SRG Coolant Temp*
- ☐ Create group: *Coolant*
- ☐ Change the X & Y position values:
X Position: -64
Y Position: 70

- ☐ Select the SIW Oil Pressure widget
- ☐ Copy and Paste it onto your screen
- ☐ Rename this new widget: *SIW Coolant Temp*
- ☐ Create group: *Coolant*
- ☐ Change the X & Y position values:
X Position: 33
Y Position: 133

Zone Properties

Inner Radius:

71

Start Angle:

135

Outer Radius:

75

End Angle:

225

Background Colors

Day:

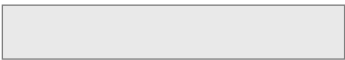
Night:

Battery Voltage

- ☐ Select the SRG Oil Pressure gauge
- ☐ Copy and Paste it onto your screen
- ☐ Rename this new gauge: *SRG Battery Voltage*
- ☐ Create group: *Battery*
- ☐ Change the X & Y position values:
X Position: 717
Y Position: 70

- ☐ Change the Tick Mark Angle values:
Angle - Start: 90
Angle - End: 270

- ☐ Edit your Warning Zones
- ☐ Select the SIW Oil Pressure widget
- ☐ Copy and Paste it onto your screen
- ☐ Rename this new widget: *SIW Battery Voltage*
- ☐ Create group: *Battery*
- ☐ Change the X & Y position values:
X Position: 738
Y Position: 132



Now we need to edit the Smart Data Items for the Smart Rotary Gauges and Smart Image Widgets we just created to ensure that each gauge and icon is tied to the appropriate variable.

The SRG Oil Pressure gauge and SIW Oil Pressure widget are already set. All we need to do is change Selector Variable values for our Coolant Temp and Battery Voltage smart gauges and widgets.

Coolant Temperature

- ☐ Select the SRG Coolant Temp gauge
- ☐ Click Edit Smart Data
- ☐ Click on the number 1 under the Selector column for Coolant Temperature and change the value to 0
- ☐ Click on the number 0 under the Selector column for Oil Pressure and change the value to 1
- ☐ Click OK

- ☐ Select the SIW Coolant Temp widget
- ☐ Click Edit Smart Data
- ☐ Click on the number 1 under the Selector column for the Coolant Temperature icon and change the value to 0
- ☐ Click on the number 0 under the Selector column for the Oil Pressure icon and change the value to 1
- ☐ Click OK

Battery Voltage

- ☐ Select the SRG Battery Voltage gauge
- ☐ Click Edit Smart Data Click on the number 2 under the Selector column for Battery Voltage and change the value to 0
- ☐ Click on the number 0 under the Selector column for Oil Pressure and change the value to 2
- ☐ Click OK

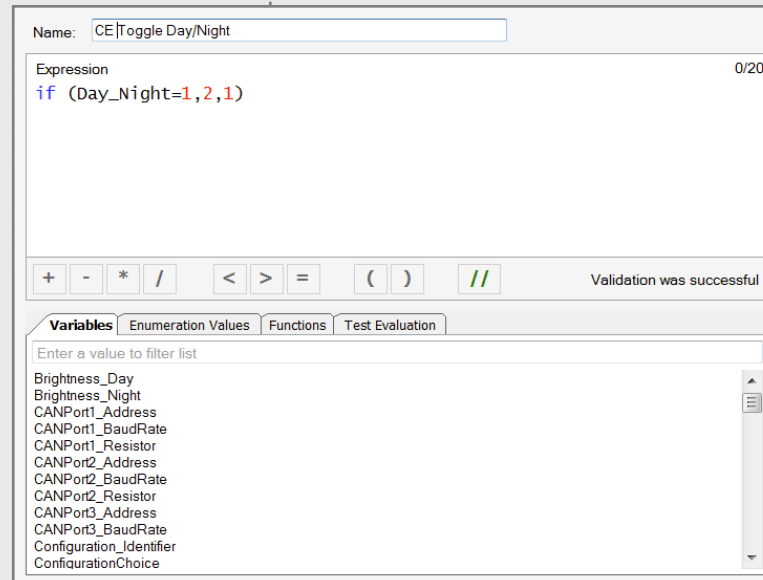
- ☐ Select the SIW Battery Voltage widget
- ☐ Click Edit Smart Data
- ☐ Click on the number 2 under the Selector column for the Battery Voltage icon and change the value to 0
- ☐ Click on the number 0 under the Selector column for the Oil Pressure icon and change the value to 2
- ☐ Click OK

Toggle Day / Night

- ❑ Go to the Programming Tab and click on the search icon (magnifying glass) next to Programming Items on the left side of the screen.
- ❑ Enter *Day/Night* into the search field
- ❑ Under the System Manager folder, click on *Day/Night* in the list
- ❑ In the Calculation Events tab, click the + on the right hand side of the screen

The Edit Expression window will appear.

- ❑ In the Name field enter: *CE Toggle Day/Night*
- ❑ Enter in the expression as follows and click OK



This creates a Calculation Event called Toggle Day/Night that we use to change the viewing mode.

Toggle Sim Data

Go to the Programming Tab and click on the search icon (magnifying glass) next to Programming Items on the left side of the screen.

- ☐ Enter: *Sim* into the search field
- ☐ Under the Data Simulation folder click on *SettingSimData* in the list
- ☐ In the Calculation Events tab, click the + on the right hand side of the screen

The Edit Expression window will appear.

- ☐ In the Name field enter: *CE Toggle SimData*
- ☐ Enter in the expression as follows and click OK

Name: CE|Toggle SimData

Expression 0/16
SettingSimData=0

+ - * / < > = () //

Validation was successful

Variables Enumeration Values Functions Test Evaluation

Enter a value to filter list

- Brightness_Day
- Brightness_Night
- CANPort1_Address
- CANPort1_BaudRate
- CANPort1_Resistor
- CANPort2_Address
- CANPort2_BaudRate
- CANPort2_Resistor
- CANPort3_Address
- CANPort3_BaudRate

OK Cancel

This creates a Calculation Event called Toggle SimData that we use to simulate live data.

2.9 // Creating Functionality

Assigning Hard Key Navigation

To program a hard key within PowerVision, in the Page Designer Tab, click on the:



The Edit Key Behaviors window will appear, and you will be able to assign that key to:

- Not Mapped
- Disabled
- Fire an Event
- Go to a View

Key Down

☒ Not Mapped

☐ Disabled

☐ Fire Event (Not Mapped)

☐ Go To View (Not Mapped)

Key Up

☒ Not Mapped

☐ Disabled

☐ Fire Event (Not Mapped)

☐ Go To View (Not Mapped)

Key Repeat

☒ Not Mapped

☐ Disabled

☐ Fire Event (Not Mapped)

☐ Go To View (Not Mapped)

Wait before starting (ms): 500

Repeat Interval (ms): 250

OK Cancel

Similar to Hard Key Navigation, if you are working with a display that has touch capabilities, you can program touch navigation to the configuration by:


- Changing a particular gauge or widget's properties under Touch Actions in the properties bar
- Using a Touch Widget from the Toolbox

By using the Touch Widget you have more control over the placement and properties of the touch area. This is helpful when dealing with small areas and layers.



- ❑ Select Key 1 () and the Edit Key Behavior - Key 1 window will appear

For Key Down, Select Fire Event and choose, CE Toggle Day/Night

- ❑ Select Key 2 () and the Edit Key Behavior - Key 2 window will appear

For Key Down, Select Fire Event and choose, CE Toggle SimData

Create and Load your configuration to test.

When accessing the Basic Page Designer Page:

- Pressing Key 1 will Toggle Day and Night viewing modes
- Pressing Key 2 will turn simulation mode on and off



COMPREHENSIVE DESIGN

*"I AM NOT INTERESTED IN POWER FOR POWER'S
SAKE, BUT I'M INTERESTED IN POWER THAT IS
MORAL, THAT IS RIGHT AND THAT IS GOOD."*

MARTIN LUTHER KING, JR.



Using Graphics to Build a Configuration

Understand Graphic Layers

Using Multiple Gauges and Widgets Together

Inputting Fonts

Adding Languages

Importing / Exporting Images

Creating Page Views

Assigning Page Navigation

Assigning Touch Actions

Creating Calculation Events

Creating User Events

Creating a Settings Menu

Understanding Page Layers

3.1 // Preparing Our Configuration

Before we proceed, let's set up this configuration by understanding how to use fonts, configure for multiple languages and import images into the image library.

Importing and Using Fonts

You can import fonts into PowerVision as long as they are True Type Fonts. There are thousands of free fonts for download via the Internet. Some things to consider with downloading fonts:

- **fonts need to be .ttf** (True Type Fonts)
- **understand the end user and the application** - some fonts do not display well numerically, in other languages or in digital format
- **fonts can enhance design and overall experience** - with little effort from the designer, a well chosen and well placed font can enhance the overall look and user experience

For this configuration we will be using new fonts that are not the default font, we need to import new fonts.

- ☐ Click on the Configuration Tab
- ☐ Click Edit Font Groups... and the Font Groups window will appear
- ☐ Click the + to add a new font, and a new font group will appear
- ☐ Change the Group Name to: *CafeNero_m54*
- ☐ Next to English, click Select Font... and the Select a font window will appear
- ☐ Click Import File.. and select the *CafeNero_m54* font in the Fonts Folder from your flash drive
- ☐ Click Open
- ☐ Select the Cafe Nero M54 font from the Select a font window pane
- ☐ Click OK

While we are at it, let's add another font. Use the previous steps as a guide and create font groups for:

- ☐ Roboto-Regular

TIP

If you are using multiple languages, you will need to select the appropriate font for these languages.

Working with Multiple Languages

PowerVision allows you to program for multiple languages. It creates a new and separate language string for each language you create.

Before you can translate languages you need to create a language string within the system:

- ☐ Click on the Configuration Tab
- ☐ Click Edit Languages and the *Manage Configuration Language* window will appear
- ☐ Click Add to add a new Language

A New Language will appear.

- ☐ Change the Language Name to: *Spanish*
- ☐ With Spanish selected, click the right facing arrow to move the language into the Selected Languages field

You now have two language strings in PowerVision: *English and Spanish*.

To add another language string follow the above example.

There are a couple of ways to do your translations:

- Use the Export / Import Language Strings from the Tools Menu
- Edit as you are developing and designing within Page Designer

We will walk through both of these examples together.

REMEMBER

When you add a language, you need to go back to your fact and assign fonts to the new language.

Importing and Exporting Images

To import images into PowerVision:

- ☐ Open the Image Library (this can be done multiple ways)
- ☐ Click Import
- ☐ Find and select the files you would like to import, and click Open

You can import more than one image at a time by selecting multiple images.

To export an image from PowerVision:

- ☐ Open the Image Library
- ☐ Select the image you would like to export and click Export
- ☐ Name the File and choose where you would like to save it
- ☐ Click Save



3.2 // Using Graphics

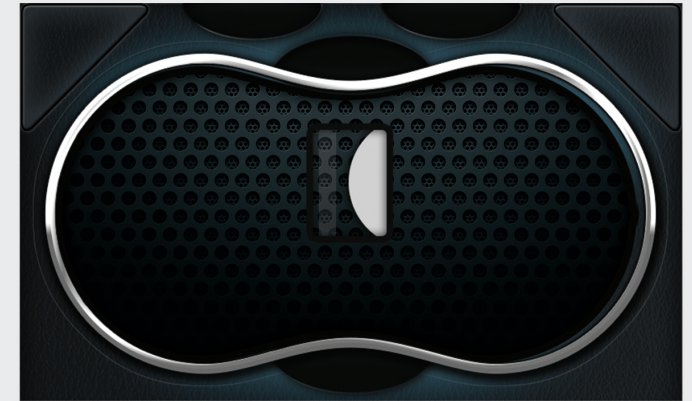
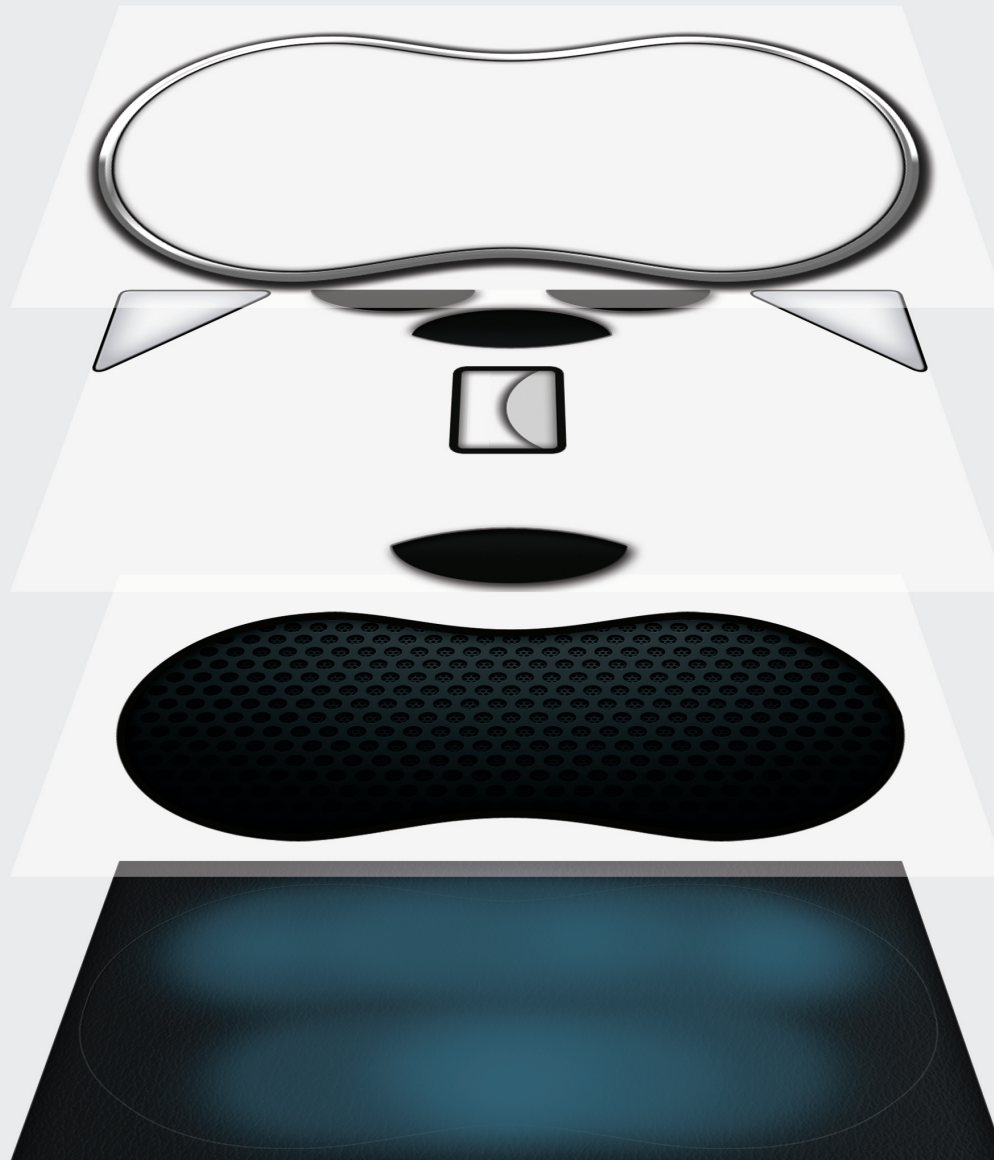
You can use graphics created by a graphic designer to create very unique and highly customized configurations. Here are some things to consider when using graphics in your configuration:

- Graphics will take up more space on the display's memory vs. using PowerVision's built in Tools
- Supported graphic file formats are: png, jpeg, bitmap and gif, but PowerVision will convert all graphics to png
- Importing the correct sized graphics will save time and limit resolution distortion.
 - 7" Display : 800x480 pixels
 - 4" Display : 480x272 pixels
 - Monochrome Displays : 320x240 pixels
- When creating icons using graphics, create them in the color white. You can colorize them within PowerVision's Image Library.

Now let's get started using graphics to build a configuration. Using the same configuration we have been working on:

- ☐ Click on the Page Designer tab
- ☐ In the Main Layer create a new page by clicking the + sign
- ☐ Name this page: *Graphics*

3.3 // Understanding Layers



TOP VIEW

GRAPHICS_OVERLAY

GRAPHICS_BEZEL

GRAPHICS_VENT

GRAPHICS_BACKGROUND



Background Layer 1

- ☐ From the Toolbox tab, drag an Image widget onto the design area
- ☐ Name this Image Widget: *IW Background*
- ☐ Change the Group Name to: *Backgrounds*
- ☐ For the Day & Night Image use image, Graphics_Background
- ☐ Change your X & Y Position
 - X Position: 0
 - Y Position: 0
- ☐ Select Designer Locked to True

Background Layer 2

- ☐ From the Toolbox tab, drag an Image widget onto the design area
- ☐ Name this Image Widget: *IW Vent Background*
- ☐ Change the Group Name to: *Backgrounds*
- ☐ For the Day & Night Image use image Graphics_Vent
- ☐ Change your X & Y Position
 - X Position: 0
 - Y Position: 0
- ☐ Select Designer Locked to True

Background Layer 3

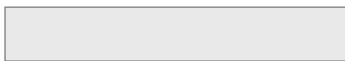
- ☐ From the Toolbox tab, drag an Image widget onto the design area
- ☐ Name this Image Widget: *IW Overlay*
- ☐ Change the Group Name to: *Backgrounds*
- ☐ For the Day & Night Image use image Graphics_Overlay
- ☐ Change your X & Y Position
 - X Position: 0
 - Y Position: 0
- ☐ Select Designer Locked to True

Background Layer 4

- ☐ From the Toolbox tab, drag an Image widget onto the design area
- ☐ Name this Image Widget: *IW Bezel*
- ☐ Change the Group Name to: *Backgrounds*
- ☐ For the Day & Night Image use image Graphics_Bezel
- ☐ Change your X & Y Position
 - X Position: 0
 - Y Position: 0
- ☐ Select Designer Locked to True

When you are done, your screen should look like this: •-----





Now let's start building some gauges. On this screen we will be monitoring:

- Engine Speed
- Vehicular Speed
- Oil Pressure
- Oil Temperature
- Engine Coolant Temperature
- Battery Voltage
- Fuel Level
- Engine Hours

❑ You will need to go to the Connections Tab and add J1939 parameters for Vehicular Speed, Engine Oil Temperature and Engine Hours (ref. Section 2.3)

Monitoring Engine RPM

We will be using multiple gauges and widgets to make this gauge: a Rotary Gauge, Curved Bar Gauge, Text Gauge and Text Widgets (x2). Look at the picture here and see if you can do this on your own. Use the applicable supplementals if you need help.



1. Rotary Gauge

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Rotary Gauge onto your screen
- ☐ Using **Supplemental 3.3.1**, change the Rotary Gauge Properties

2. Curved Bar Gauge

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Curved Bar Gauge onto your screen
- ☐ Using **Supplemental 3.3.2**, change the Text Widget Properties

3. Text Gauge

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Text Gauge onto your screen
- ☐ Using **Supplemental 3.3.3**, change the Text Gauge Properties

Don't forget the Text Widgets...

- ☐ Use **Supplemental 3.3.4**, and **3.3.5** to change the Text Widget Properties

TIP

Once you have finished each gauge, click Designer Locked to True so that your gauges don't interfere with your designing.

NOTE

Watch how your gauges are layered in ordered to give you the best User Experience.



Supplemental 3.3.1

Rotary Gauge Properties	
[-] (Name)	
Display Name	RG RPM
Group	RPM
Include in Programming	False
[-] (Position)	
(Designer Locked)	True
Show Touched	False
X Position	50
Y Position	53
Width	390
Height	346
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
[-] (Show In View)	
Default Graphics View	True
[-] (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
[-] Advanced Features	
Visible Condition	Condition Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
Warning Zones	Edit Zones...
[-] Background	
(Background Enabled)	True
Fill Day	<input type="checkbox"/> Transparent
Fill Night	<input type="checkbox"/> Transparent
Outline Day	<input type="checkbox"/> Transparent
Outline Night	<input type="checkbox"/> Transparent
[-] Data	
Variable	11939_Engine_Engine_Speed
Variable Unit	RPM
Minimum Value	0.
Maximum Value	6000.
Smoothing	1.
[-] Data Error	
Day Blend Color	<input type="checkbox"/> LightGray
Night Blend Color	<input type="checkbox"/> LightGray
[-] Hub	
Day Color	<input type="checkbox"/> Transparent
Night Color	<input type="checkbox"/> Transparent
Radius	0

[-] Image	
Day	<input type="checkbox"/> (Empty Image)
Night	<input type="checkbox"/> (Empty Image)
X Position	0
Y Position	0
[-] Needle	
Length - Inside	0
- Outside	0
Width - Base	0
- Middle	0
- End	0
Day Color	<input type="checkbox"/> Transparent
Night Color	<input type="checkbox"/> Transparent
[-] Tick Marks	
Angle - Start	293
- End	65
Value - Start	0
- End	60
Major - Number	7
- Length	20
- Width	3
Minors - Number	3
- Length	15
- Width	1
Day Color	<input type="checkbox"/> WhiteSmoke
Night Color	<input type="checkbox"/> WhiteSmoke
[-] Tick Text	
Font Group	CafeNero_m54
Font Height	16
Center Text	False
Distance From Mark	9
Day Color	<input type="checkbox"/> WhiteSmoke
Night Color	<input type="checkbox"/> WhiteSmoke
[-] Unit Text	
Unit Text	
Font Group	Default Font Group
Font Height	4
Distance From Center	0
Day Color	<input type="checkbox"/> Transparent
Night Color	<input type="checkbox"/> Transparent

Supplemental 3.3.2

Curved Bar Gauge Properties



- (Name)	
Display Name	CBG RPM
Group	RPM
Include in Programming	False
- (Position)	
(Designer Locked)	True
Show Touched	False
X Position	50
Y Position	53
Width	390
Height	346
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
- (Show In View)	
Default Graphics View	True
- (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
- Advanced Features	
Visible Condition	Condition Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
- Background	
Fill Day	<input type="checkbox"/> Transparent
Fill Night	<input type="checkbox"/> Transparent
Outline Day	<input type="checkbox"/> Transparent
Outline Night	<input type="checkbox"/> Transparent
- Data	
Variable	11939 Engine Engine Speed
Variable Unit	RPM
Minimum Value	0.
Maximum Value	6000.
Smoothing	0.5
- Data Error	
Day Blend Color	<input type="checkbox"/> LightGray
Night Blend Color	<input type="checkbox"/> LightGray
- Display Bar	
Gauge Style	Circle Right
Inside Radius	162
Angle - Start	293
Angle - End	65
Day Color	<input type="checkbox"/> (255,238,46,36)
Night Color	<input type="checkbox"/> (255,238,46,36)

Supplemental 3.3.3

Text Gauge Properties	
[-] (Name)	
Display Name	TG RPM
Group	RPM
Include in Programming	False
[-] (Position)	
(Designer Locked)	True
Show Touched	False
X Position	135
Y Position	188
Width	191
Height	81
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
[-] (Show In View)	
Default Graphics View	True
[-] (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
[-] Advanced Features	
Visible Condition	Condition Disabled...
List Binding	Binding Disabled...
[-] Data	
Variable	J1939_Engine_Engine_Speed
Variable Unit	RPM
Minimum Value	0.
Maximum Value	6000.
Smoothing	1.
Decimal Places	0
Display Format	Decimal
Divided By	1.
Leading Zeros	0
Smallest Increment	1.
[-] Data Error	
Day Blend Color	<input type="color"/> LightGray
Night Blend Color	<input type="color"/> LightGray
[-] Display Text	
Font Group	CafeNero_m54
Font Height	58
Vertical Alignment	Bottom
Horizontal Alignment	Right
Day	<input type="checkbox"/> WhiteSmoke
Night	<input type="checkbox"/> WhiteSmoke

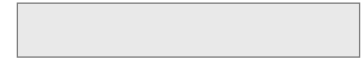
[-] Drop Shadow	
Show Shadow	False
Shadow Color	<input type="color"/> Gray
Shadow X Offset	5
Shadow Y Offset	5
[-] Unit Text	
Text String	
Font Group	Default Font Group
Font Height	4
Day Color	<input type="checkbox"/> Transparent
Night Color	<input type="checkbox"/> Transparent

Supplemental 3.3.4

Text Widget Properties	
[-] (Name)	
Display Name	TW RPM
Group	RPM
Include in Programming	False
[-] (Position)	
(Designer Locked)	True
Show Touched	False
X Position	272
Y Position	170
Width	52
Height	23
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
[-] (Show In View)	
Default Graphics View	True
[-] (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
[-] Advanced Features	
Visible Condition	Condition Disabled...
List Binding	Binding Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
Override String	(Not Mapped)
[-] Display Text	
Text String	RPM
Font Group	Arial
Font Height	22
Vertical Alignment	Bottom
Horizontal Alignment	Right
Word Wrap	True
Clip	False
AutoScroll Text	False
Day Color	 (255,238,46,36)
Night Color	 (255,238,46,36)
[-] Drop Shadow	
Show Shadow	False
Shadow Color	<input type="checkbox"/> Transparent
Shadow X Offset	0
Shadow Y Offset	0

Supplemental 3.3.5

Text Widget Properties	
[-] (Name)	
Display Name	TW x100
Group	RPM
Include in Programming	False
[-] (Position)	
(Designer Locked)	True
Show Touched	False
X Position	218
Y Position	172
Width	52
Height	23
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
[-] (Show In View)	
Default Graphics View	True
[-] (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
[-] Advanced Features	
Visible Condition	Condition Disabled...
List Binding	Binding Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
Override String	(Not Mapped)
[-] Display Text	
Text String	x100
Font Group	Arial
Font Height	15
Vertical Alignment	Bottom
Horizontal Alignment	Right
Word Wrap	True
Clip	False
AutoScroll Text	False
Day Color	<input type="checkbox"/> WhiteSmoke
Night Color	<input type="checkbox"/> WhiteSmoke
[-] Drop Shadow	
Show Shadow	False
Shadow Color	<input type="checkbox"/> Transparent
Shadow X Offset	0
Shadow Y Offset	0



Monitoring Vehicular Speed

We will be using a Text Gauge and Text Widget to monitor Wheel Based Vehicle Speed. Look at the picture here and see if you can do this on your own. Use the applicable supplementals if you need help. •----

1. Text Gauge

- ☐ Click on the Toolbox tab
- ☐ Click and drag a Text Gauge onto your screen
- ☐ Using [Supplemental 3.3.6](#), change the Text Gauge Properties

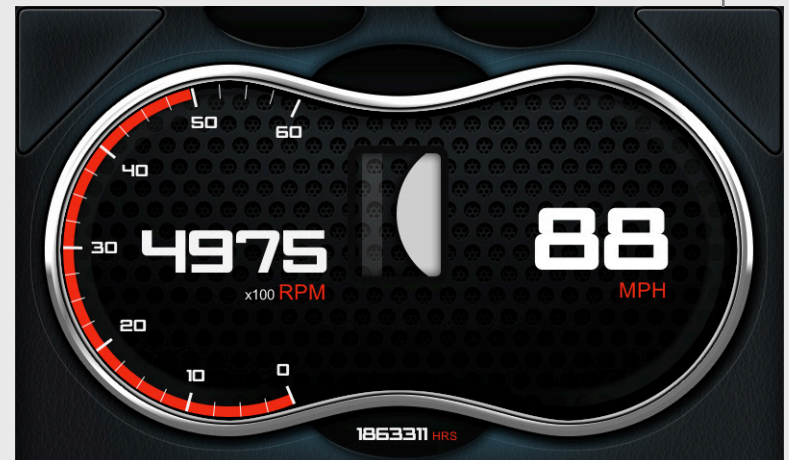
Don't forget the Text Widget...

- ☐ Use [Supplemental 3.3.7](#)

Monitoring Engine Hours

We will be using a Text Gauge to monitor Engine Hours.

- ☐ Click and drag a Text Gauge onto your screen
- ☐ Using [Supplemental 3.3.8](#), change the Text Gauge Properties





Supplemental 3.3.6

Text Gauge Properties	
(Name)	
Display Name	TG MPH
Group	MPH
Include in Programming	False
(Position)	
(Designer Locked)	True
Show Touched	False
X Position	582
Y Position	185
Width	100
Height	107
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
(Show In View)	
Default Graphics View	True
(Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
Advanced Features	
Visible Condition	Condition Disabled...
List Binding	Binding Disabled...
Data	
Variable	11939_Engine_Wheel_Based_Vehid...
Variable Unit	mph
Minimum Value	0.
Maximum Value	250.
Smoothing	1.
Decimal Places	0
Display Format	Decimal
Divided By	1.
Leading Zeros	0
Smallest Increment	1.
Data Error	
Day Blend Color	<input type="checkbox"/> LightGray
Night Blend Color	<input type="checkbox"/> LightGray
Display Text	
Font Group	CafeNero_m54
Font Height	85
Vertical Alignment	Bottom
Horizontal Alignment	Right
Day	<input type="checkbox"/> White
Night	<input type="checkbox"/> White

Drop Shadow	
Show Shadow	False
Shadow Color	<input type="checkbox"/> Transparent
Shadow X Offset	5
Shadow Y Offset	5
Unit Text	
Text String	
Font Group	Default Font Group
Font Height	4
Day Color	<input type="checkbox"/> Transparent
Night Color	<input type="checkbox"/> Transparent

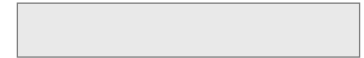
Supplemental 3.3.7

Text Widget Properties	
- (Name)	
Display Name	TW MPH
Group	MPH
Include in Programming	False
- (Position)	
(Designer Locked)	True
Show Touched	False
X Position	626
Y Position	172
Width	52
Height	23
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
- (Show In View)	
Default Graphics View	True
- (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
- Advanced Features	
Visible Condition	Condition Disabled...
List Binding	Binding Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
Override String	(Not Mapped)
- Display Text	
Text String	MPH
Font Group	Arial
Font Height	22
Vertical Alignment	Bottom
Horizontal Alignment	Right
Word Wrap	True
Clip	False
AutoScroll Text	False
Day Color	 (255,238,46,36)
Night Color	 (255,238,46,36)
- Drop Shadow	
Show Shadow	False
Shadow Color	<input type="checkbox"/> Transparent
Shadow X Offset	0
Shadow Y Offset	0

Supplemental 3.3.8

Text Gauge Properties	
[-] (Name)	
Display Name	TG Engine Hours
Group	Engine Hours
Include in Programming	False
[-] (Position)	
(Designer Locked)	True
Show Touched	False
X Position	329
Y Position	25
Width	100
Height	30
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
[-] (Show In View)	
Default Graphics View	True
[-] (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
[-] Advanced Features	
Visible Condition	Condition Disabled...
List Binding	Binding Disabled...
[-] Data	
Variable	J1939 Engine Engine Total Hours...
Variable Unit	hr
Minimum Value	0.
Maximum Value	210554096.
Smoothing	1.
Decimal Places	0
Display Format	Decimal
Divided By	1.
Leading Zeros	0
Smallest Increment	1.
[-] Data Error	
Day Blend Color	<input type="checkbox"/> LightGray
Night Blend Color	<input type="checkbox"/> LightGray
[-] Display Text	
Font Group	CafeNero_m54
Font Height	17
Vertical Alignment	Bottom
Horizontal Alignment	Right
Day	<input type="checkbox"/> WhiteSmoke
Night	<input type="checkbox"/> WhiteSmoke

[-] Drop Shadow	
Show Shadow	False
Shadow Color	<input type="checkbox"/> Transparent
Shadow X Offset	0
Shadow Y Offset	0
[-] Unit Text	
Text String	HRS
Font Group	Arial
Font Height	12
Day Color	<input type="checkbox"/> (255,238,46,36)
Night Color	<input type="checkbox"/> (255,238,46,36)



Monitoring Oil Pressure, Oil Temperature, Coolant Temperature, Battery Voltage, and Fuel Level

Look at the picture here and see if you can do this on your own. Once you have worked through Section 3.3 and have added these five gauges you should have a configuration that looks like this:

- ☐ Oil Pressure
- ☐ Oil Temperature
- ☐ Coolant Temperature
- ☐ Battery Voltage

- ☐ Fuel Level - Supplemental 3.3.9

Add icons from your flash drive or Image Library for page navigation:

- ☐ Add Left Arrow
- ☐ Add Right Arrow
- ☐ Add Menu Icon

REMEMBER

Make sure to use proper naming conventions.

Make sure Show Advanced is selected at the bottom of the properties bar.

Specify both day and night properties.

Put each of your gauge elements into groups, and it will be easier to manage as you build your configuration.



Supplemental 3.3.9

Bar Gauge Properties

[-] (Name)

Display Name

BG Fuel

Group

Fuel

Include in Programming

False

[-] (Position)

(Designer Locked)

True

Show Touched

False

X Position

353

Y Position

201

Width

90

Height

128

Rotation

0

Rotation Pin X

0

Rotation Pin Y

0

[-] (Show In View)

Default Graphics View

True

[-] (Touch Actions)

Touch Action

[\(Not Mapped\)](#)

Touch Action - Start

[\(Not Mapped\)](#)

Touch Action - Continue

[\(Not Mapped\)](#)

Touch Action - Release

[\(Not Mapped\)](#)

[-] Advanced Features

Visible Condition

[Condition Disabled...](#)

Background Primitives

[Edit Primitives...](#)

Foreground Primitives

[Edit Primitives...](#)

Warning Zones


[Edit Zones...](#)

[-] Background


(Enabled)

True


Fill Day

 [Black](#)


Fill Night

 [Black](#)

Outline Day

 [Black](#)

Outline Night

 [Black](#)

[-] Data

Variable

[11939 Engine Fuel Level](#)

Variable Unit

[%](#)

Minimum Value

0.

Maximum Value


100.

Smoothing


1.

[-] Data Error

Day Blend Color

 [LightGray](#)

Night Blend Color


 [LightGray](#)

[-] Display Bar


Gauge Style

Sweep Up | Ticks Left


Day Color

 [\(255,238,46,36\)](#)


Night Color

 [\(255,238,46,36\)](#)

Day Image

 [\(Empty Image\)](#)

Night Image

 [\(Empty Image\)](#)

[-] Tick Marks

Majors - Number

2

- Length

0

- Width

0

Minors - Number

0

- Length

0

- Width

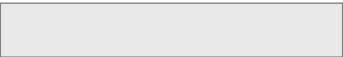
0

Day Color

☐ [Transparent](#)

Night Color

☐ [Transparent](#)



3.4 // Adding Warning Icons Using Graphics

Using Visible Conditions and images, create warning and critical lamp indicators for Coolant Temperature and Battery Voltage.

- ☐ Click on the Toolbox tab
- ☐ Click and drag an Image Widget onto your screen
- ☐ Name this Image Widget: *IW Coolant Warning*
- ☐ Change the X and Y Position
 - X Position: 0
 - Y Position: 327
- ☐ Select image: *left-yellow* for both Day and Night Images
- ☐ Set appropriate Visible Conditions (ref. Section 2.6)
- ☐ Select Designer Locked to True

Follow this same process to create:

- ☐ Critical indicator lamp for Coolant Temp (use image: *left-red*)
- ☐ Warning indicator lamp for Battery Voltage (use image: *right-yellow*)
- ☐ Critical indicator lamp for Battery Voltage (use image: *right-red*)

3.5 // Creating a Settings Menu

Now, let's create a Settings Menu.

The Background

- ☐ In the Settings Layer, change the name of the Settings Page to: *Blank Page*
- ☐ Create a new page and name it: *Settings*

- ☐ Drag an Image Widget onto the Settings page
- ☐ Change the name to: *IW Settings Background*
- ☐ Put it in the group: *Background*
- ☐ Change Designer Locked to True
- ☐ Set both the X & Y Positions to 0

- ☐ Set the Day and Night Image
- ☐ From the image Library or Flash Drive, use the image Settings_Background as the Day and Night image.



The Menu Titles

Using a Text Widget, create a Menu Title for:

- ☐ Brightness (Name it: *TW Brightness*)
- ☐ Language (Name it: *TW Language*)
- ☐ Simulate Data (Name it: *TW Simulate Data*)
- ☐ Viewing Mode (Name it: *TW Viewing Mode*)

TIP
Use Copy / Paste shortcuts

Using a Rectangle Widget, create a selector for each title.

- ☐ Brightness (Name it: *RW Brightness Selector*)
- ☐ Language (Name it: *RW Language Selector*)
- ☐ Simulate Data (Name it: *RW Sim Data Selector*)
- ☐ Viewing Mode (Name it: *RW Viewing Mode Selector*)

Make each selector have a:

- ☐ Height = 3
- ☐ Start Color of Lime
- ☐ No Outline

You should have a screen that looks similar to this:



Create Page Views for Each Menu Setting

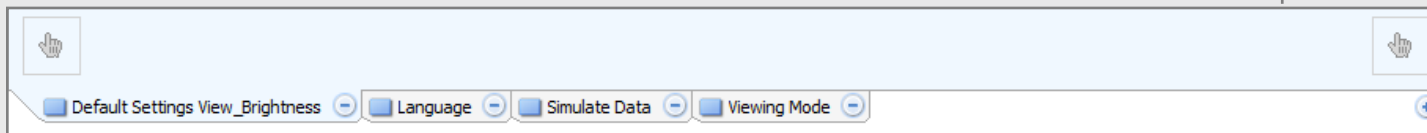
We will have the Brightness Menu be the default view when the Settings Menu is accessed.

- ☐ Change the Current View (above the design area) to: *Default Settings View_Brightness*
- ☐ Right Click on the tab Default Settings View_Brightness (at the bottom left of the design area)
- ☐ Select Duplicate View
- ☐ In the new tab / Page View you just created, change the Current View (above the design area) to: *Language*

Repeat to create a new Page View for:

- ☐ Simulate Data
- ☐ Viewing Mode

You should have 4 tabs / Page Views at the bottom of your design area like this:

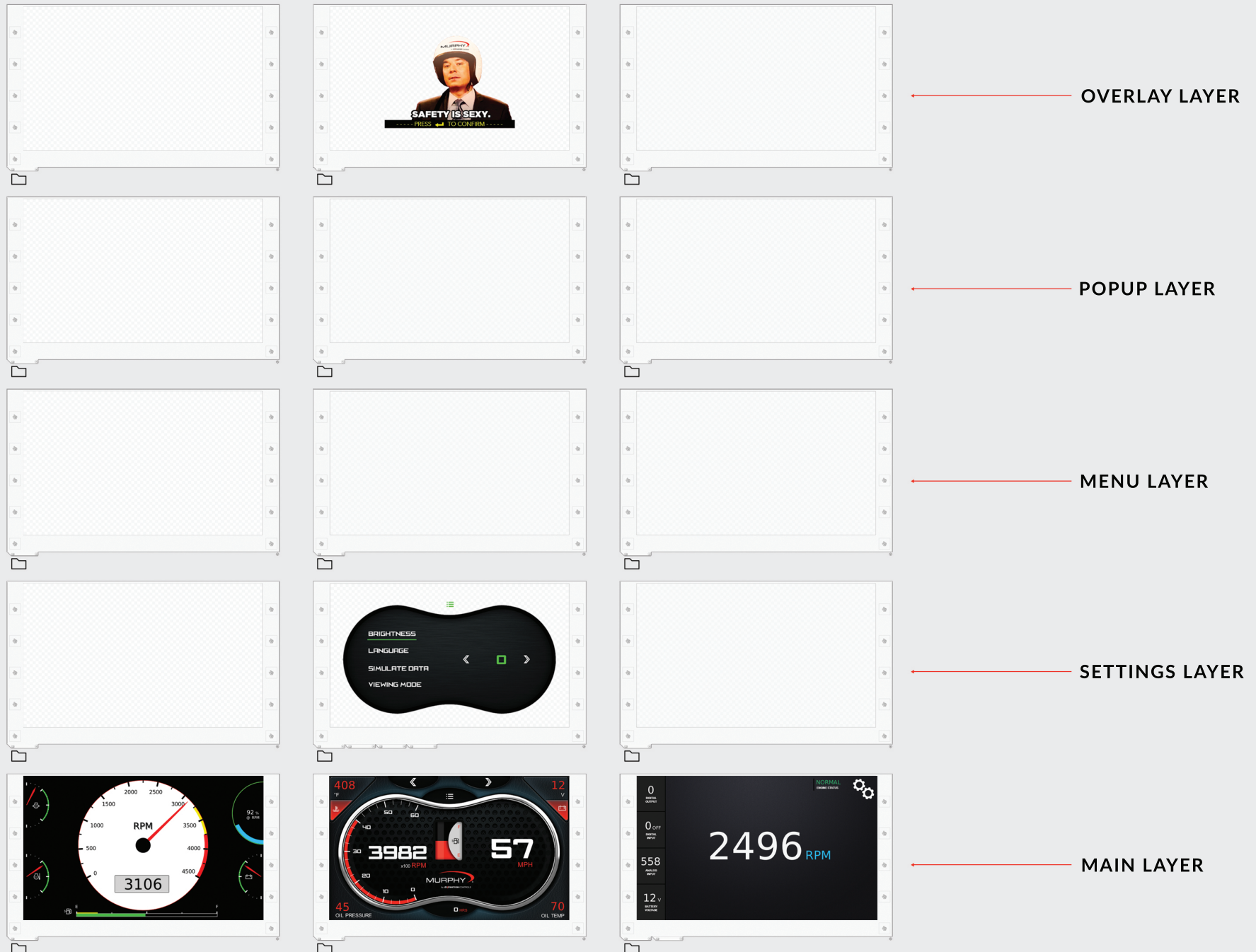


Develop Each Menu's Page View

- ☐ Select the Tab / Page View for Default Settings View_Brightness
- ☐ Select the RW Brightness Selector
- ☐ In the properties menu under the Show In View section, change to only show in Default Settings View_Brightness
- ☐ Repeat this process so that each Menu's page view has the appropriate selector (green underline) beneath it

When you are done, you should have Page Views that look similar to these:






Brightness Menu

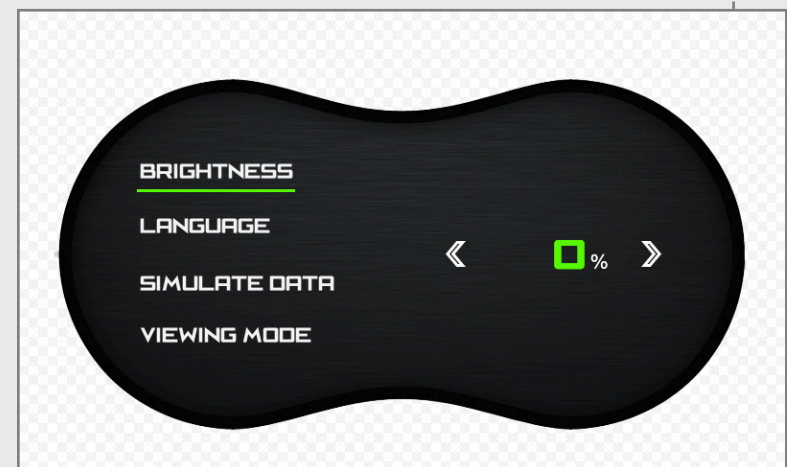
- ☐ Select the Tab / Page View for Default Settings View_Brightness
- ☐ Add a Smart Text Gauge to your screen
- ☐ Name it: *STG Brightness*
- ☐ Put it in the Brightness Group
- ☐ Edit Smart Data Items •-----
- ☐ For the Selector Variable select Day/Night (note that the Auto Create box is **not** checked)
- ☐ Click OK

Gauge Data Selector Variable

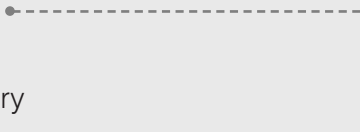
Selector Variable:  ☐ Auto Create

Variable List							
Selector ID	Mapped Variable	Display Unit	Label	Min	Max	Decimals	
1	Brightness.Day	raw	%	0.00	100.00	0	
2	Brightness.Night	raw	%	0.00	100.00	0	


- ☐ Add Left & Right Arrows from Image Library
- ☐ Change the STG Brightness properties so that you have a page that looks similar to this: •-----



Language Menu

- ☐ Select the Tab / Page View for Language
- ☐ Click and Drag a Smart Text Widget onto the screen
- ☐ Name it: *STW Language*
- ☐ Put it in the Language Group
- ☐ Edit Smart Data Items
- ☐ For the Selector Variable select LanguageSelection (note that the Auto Create box is **not** checked)
- ☐ Click OK
- ☐ Click the +
- ☐ Input the Enumeration Values as follows: 
- ☐ Add Left & Right Arrows from Image Library

Smart Text Selector Variable

Selector Variable:  ☐ Auto Create

Enumeration Values + -





Selector Value	Description	DisplayValue
0	English	English
1	Spanish	Ingles

- ☐ Change the STW Language properties so that you have a page that looks similar to this:



Simulate Data Menu

- ☐ Click and Drag a Smart Image Widget onto the screen
- ☐ Name this widget: *SIW SimData*
- ☐ Put it in the Simulate Data Group
- ☐ For the Selector Variable select SettingSimData (Note that the Auto Create box is **not** checked)
- ☐ Click the +
- ☐ Create the image list as follows: •-----
- ☐ Use images *Switch On* and *Switch Off* from the flash drive
- ☐ Click OK

Selector ID	Day Image	Night Image
0	OFF  ON	OFF  ON
1	OFF  ON	OFF  ON

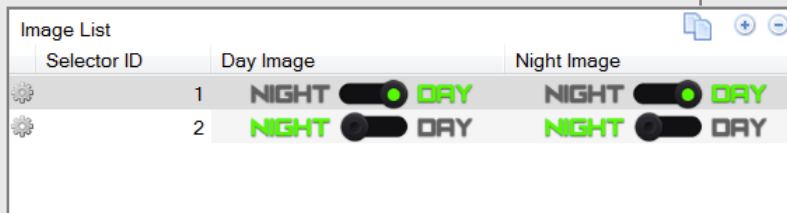
When you are done, you should have a Page View that looks similar to this: •-----



Viewing Mode Menu

Click and Drag a Smart Image Widget onto the screen

- ☐ Name this widget: *SIW Viewing Mode*
- ☐ Put it in the Viewing Mode Group
- ☐ For the Selector Variable select Day/Night (Note that the Auto Create box is **not** checked)
- ☐ Click the +
- ☐ Create the image list as follows: •-----
- ☐ Use images *Day On* and *Night On* from the flash drive
- ☐ Click OK



When you are done, you should have a Page View that look similar to this: •-----



3.6 // Creating Calculation Events for Brightness

Now that we have created our Settings Pages, we need to set up Calculation Events for Brightness when the display is in Day Mode and for when the display is in Night Mode.

Set up Calculation Events for Brightness when the display is in Day Mode.

☐ In the Programming Tab, search for Brightness

☐ Select *Brightness.Day*

☐ Add a Calculation Event

☐ Name it: *CE Brightness.Day+5*

☐ Enter the expression

IF(Day_Night=1 , MIN(Brightness_Day+5,100),Brightness_Day)

☐ Add another Calculation Event

☐ Name it: *CE Brightness.Day-5*

☐ Enter the expression

IF(Day_Night=1 , MAX(Brightness_Day-5,0),Brightness_Day)

Set up Calculation Events for Brightness when the display is in Night Mode.

☐ In the Programming Tab, search for Brightness

☐ Select *Brightness.Night*

☐ Add a Calculation Event

☐ Name it: *CE Brightness.Night+5*

☐ Enter the expression

IF(Day_Night=2 , MIN(Brightness_Night+5,100),Brightness_Night)

☐ Add another Calculation Event

☐ Name it: *CE Brightness.Night-5*

☐ Enter the expression

IF(Day_Night=2 , MAX(Brightness_Night-5,0),Brightness_Night)

Now we need to create User Events to be able to increase and decrease Brightness.

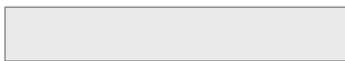
UE Brightness Up 5

- ☐ In the Programming Tab click the +
- ☐ Select *New User Event*
- ☐ Name it: *UE Set Brightness Up5*
- ☐ In the Actions tab click the +
- ☐ Select Central Control Module > Fire Event > CE Brightness.Day+5
- ☐ Click OK

- ☐ In the Actions tab click the +
- ☐ Select Central Control Module > Fire Event > CE Brightness.Night+5
- ☐ Click OK

- ☐ In the Actions tab click the +
- ☐ Select System Manager > Update Backlight > (Empty)
- ☐ Click OK





UE Brightness Dn 5

- ☐ In the Programming Tab click the +
- ☐ Select *New User Event*
- ☐ Name it: *UE Set Brightness Dn5*
- ☐ In the Actions tab click the +
- ☐ Select Central Control Module > Fire Event > CE Brightness.Day-5
- ☐ Click OK
- ☐ In the Actions tab click the +
- ☐ Select Central Control Module > Fire Event > CE Brightness.Night-5
- ☐ Click OK
- ☐ In the Actions tab click the +
- ☐ Select System Manager > Update Backlight > (Empty)
- ☐ Click OK

Now we can fire events to inc/dec brightness values by calling *UE Set Brightness Up 5* and *UE Set Brightness Dn 5*.

- ☐ Go back to the Page Designer Tab and select the Settings Layer
- ☐ In the Default Settings View_Brightness, for the left and right arrows, assign touch actions to fire the events *UE Set Brightness Dn5* and *UE Set Brightness Up5* that we just created

3.7 // Creating a User Event for Selecting Languages

- ☐ In the Programming Tab click the + in the Programming Items pane
- ☐ Select *New User Event*
- ☐ Name it: *UE Language_Next Value*
- ☐ In the Actions tab click the +
- ☐ Select Screen Application > NextValue > Settings Page.STW Language
- ☐ Click OK

- ☐ In the Actions tab click the + again
- ☐ Select Screen Application > Process > (Empty)
- ☐ Click OK

Go back to the Page Designer Tab and select the Settings Layer

- ☐ In the Language page view / tab, for the left and right arrows, assign touch actions to fire the event *Language_Next Value* that we just created



3.8 // Assigning Actions to Keep User Settings

The changes that we make will not automatically save when the display is powered off and back on. We need to create and fire an event that will save our settings on a power cycle.

- ☐ In the Programming Tab create a *New User Event*
- ☐ Name it: *UE Keep User Settings*
- ☐ In the Actions Tab, Click the +
- ☐ Select Database Manager > Save > Brightness.Day
- ☐ Select Database Manager > Save > Brightness.Night
- ☐ Select Database Manager > Save > Day/Night
- ☐ Select Database Manager > Save > Language Selection

Now you need to have a way to fire the event *Keep User Settings*.

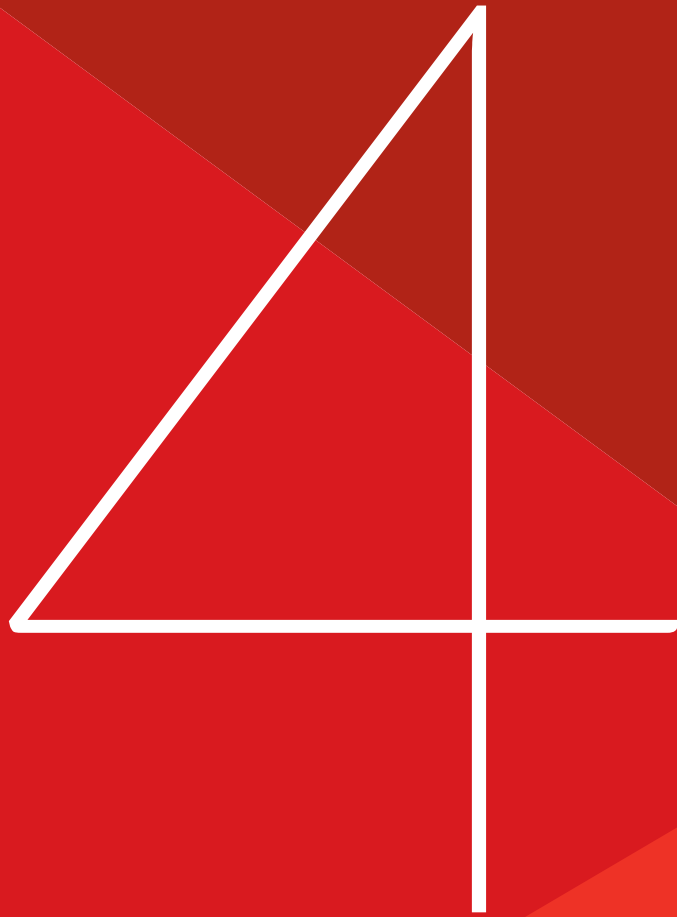
There are multiple ways this can be done. If you need help when you get to this point, ask one of the instructors.



INPUT / OUTPUT

*"I HOPE OUR WISDOM WILL GROW WITH OUR
POWER, AND TEACH US, THAT THE LESS WE USE
OUR POWER THE GREATER IT WILL BE."*

THOMAS JEFFERSON



Assigning Inputs / Outputs

Creating Gauges to Read Inputs / Outputs

Creating Conditional Events

Using Timers

Creating Input / Output Definitions

Creating Input / Output Curves

4.1 // Assigning I/O

There are a few things that you need to know before activating the IO within the PowerVision software.

1. The types of IO and the amount of IO differ depending on the hardware.
2. You can view a given hardware's IO compliment by clicking on the Connections Tab.
3. You can view the specific pinout for any given hardware by clicking on View Pinout in the upper right side of the Connections Tab.

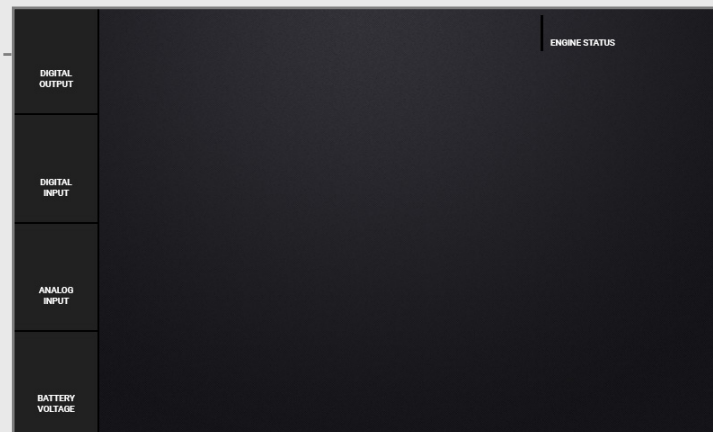
During this class we will be assigning:

- 1 Digital Output
- 1 Digital Input
- 1 Analog Input
- 1 Battery Voltage Input

Let's create a new page in our configuration to test animation and IO features.

- ☐ Open the configuration that we have been working on, *PowerVision Essentials Training*
- ☐ Click on the Page Designer Tab
- ☐ In the Main Layer, create a new page and name it: *IO Animations*
- ☐ For the Page Properties, for the Day and Night images use: *IO Background*, from your flash drive
- ☐ Add page navigation so that when we load this configuration onto the display we can get to this new page.

You should have a page that looks like this: •-----



4.2 // Assigning the Digital Output

- ☐ Click on the Connections Tab
- ☐ Under the Module Setup pane, Select Digital Output
- ☐ Click the Auto Create box.

By clicking auto create, you are creating a variable within PowerVision for the Digital Output. It should have generated a variable name similar to: *IO.Digital Output* and is located in the *Input Output Port Manager* folder in the Programming Tab.

Now we need to create 2 User Events that will turn the Digital Output on and off.

User Event for Digital Output Off

- ☐ In the Programming Tab, Select the *Input Output Port Manager* folder (by having this folder selected, whatever new programming item that is created will be put in this folder)
- ☐ Now click the + in the Programming Items pane
- ☐ Select New User Event
- ☐ Change the name to: *UE DigOut Off*
- ☐ In the Actions Tab, click the +
- ☐ Select Input Output Port Manager (IO) > Digital Output Low > Digital Output

User Event for Digital Output On

- ☐ Now click the + in the Programming Items pane
- ☐ Select New User Event
- ☐ Change the name to: *UE DigOut On*
- ☐ In the Actions Tab, click the +
- ☐ Select Input Output Port Manager (IO) > Digital Output High > Digital Output

Now lets create a Text Gauge and assign a button press to test the Digital Output.

- ❑ Click on the Page Designer Tab
- ❑ Select the I/O Animations page that you created above
- ❑ From the Toolbox, drag a Text Gauge onto the design canvas
- ❑ Name this Text Gauge: *TG DigOut*
- ❑ In the Text Gauge Properties pane, assign it to the variable you created for the Digital Output above (i.e. *IO.Digital Output*)
- ❑ Using **Supplemental 4.2.1**, change the Text Gauge Properties



Supplemental 4.2.1

Text Gauge Properties

[-] (Name)

Display Name	TG DigOut
Group	IO
Include in Programming	False

[-] (Position)

(Designer Locked)	True
Show Touched	False
X Position	7
Y Position	419
Width	80
Height	32
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0

[-] (Show In View)

Default I/O Animations View	True
System Overview Page	True

[-] (Touch Actions)

Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)

[-] Advanced Features

Visible Condition	Condition Disabled...
List Binding	Binding Disabled...

[-] Data

Variable	IO_Digital_Output
Variable Unit	raw
Minimum Value	0.
Maximum Value	6000.
Smoothing	1.
Decimal Places	0
Display Format	Decimal
Divided By	1.
Leading Zeros	0
Smallest Increment	1.

[-] Data Error

Day Blend Color	<input type="checkbox"/> LightGray
Night Blend Color	<input type="checkbox"/> LightGray

[-] Display Text

Font Group	Roboto-Regular
Font Height	35
Vertical Alignment	Center
Horizontal Alignment	Center
Day	<input type="checkbox"/> WhiteSmoke
Night	<input type="checkbox"/> WhiteSmoke


[-] Drop Shadow

Show Shadow	False
Shadow Color	<input type="checkbox"/> Gray
Shadow X Offset	5
Shadow Y Offset	5

[-] Unit Text

Text String	
Font Group	Default Font Group
Font Height	15
Day Color	<input checked="" type="checkbox"/> Black
Night Color	<input checked="" type="checkbox"/> Black

Now let's fire the two User Events we created. There are many ways to fire events within PowerVision; for this example we will fire these events by Editing the Key Behaviors.

- ❑ Select the upper right () and the Edit Key Behavior - Key 2 window will appear
- ❑ For Key Down, Select Fire Event and choose, UE DigOut On
- ❑ For Key Up, Select Fire Event and choose, UE DigOut Off

Create and Load your configuration to test.

When you press and hold Key 2 on the display you should see:

- the Digital Output variable display a 1
- the light should be on

When Key 2 is released on the display you should see:

- the Digital Output variable display a 0
- the light should be off

To build upon this example, let's have the digital output fire when we have Engine Overspeed.





First, let's assign conditions to the 2 User Events that we just created (1) for the engine's accepted operating range and (2) for the engine's overspeed range.

Assign a condition for DigOut Off

- ☐ Click on the Programming Tab
- ☐ Select and expand the Input Output Port Manager folder
- ☐ Select the User Event: *UE DigOut Off*
- ☐ Select the Conditions Tab and click the + (take note of the name, we will be selecting this in upcoming steps)
- ☐ With the Variables Tab selected, start typing in speed (the list should filter automatically)
- ☐ Double Click on: *J1939_Engine_Engine_Speed*
- ☐ Complete the expression as follows: *J1939_Engine_Engine_Speed<=3000*

- ☐ Click OK

Assign a condition for DigOut On

- ☐ Select and expand the Input Output Port Manager folder
- ☐ Select the User Event: *UE DigOut On*
- ☐ Select the Conditions Tab and click the + (take note of the name, we will be selecting this in upcoming steps)
- ☐ With the Variables Tab selected, start typing in speed (the list should filter automatically)
- ☐ Double Click on: *J1939_Engine_Engine_Speed*
- ☐ Complete the expression as follows: *J1939_Engine_Engine_Speed>3000*
- ☐ Click OK

Now we need to create an event that will continually check the engine's speed and fire the appropriate events we just created if the conditions are met.

Create a User Event to check Engine Speed

- ☐ Select and expand the Input Output Port Manager folder
- ☐ Click the + and select New User Event
- ☐ Change the name to: *UE RPM Check*
- ☐ With the Actions Tab selected, click the +
- ☐ Select Central Control Module (CCM) > Fire Event > UE DigOut Off Condition
- ☐ With the Actions Tab still selected, click the +
- ☐ Select Central Control Module (CCM) > Fire Event > UE DigOut On Condition

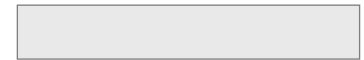
Now we need to set a timer that regulates how often this event checks these conditions.

- ☐ With the *UE RPM Check* event still selected
- ☐ Click the Timers Tab and click the +
- ☐ Click on the new timer and change the name to: *TM RPM Check*
- ☐ Make this a recurring timer with a 250 ms duration

Because this is a recurring timer, it will automatically start on startup. If this was a one shot timer, we would need to program the timer to start.

Now let's create an RPM gauge, a Smart Text Widget and a button press to fire the Calculate Toggle SimData Event we created so that we can test what we have done.

- ☐ Click on the Page Designer Tab
- ☐ Select the I/O Animations page that you created above
- ☐ From the Toolbox, drag a Text Gauge onto the design canvas
- ☐ Name this Text Gauge: *TG RPM*
- ☐ Using [Supplemental 4.2.2](#), change the Text Gauge Properties
- ☐ From the Toolbox, drag a Smart Text Widget onto the design canvas
- ☐ Name this Smart Text Widget: *STW Engine Status*
- ☐ Using [Supplemental 4.2.3](#), change the Smart Text Widget Properties






Supplemental 4.2.2

Text Gauge Properties	
[-] (Name)	
Display Name	TG RPM
Group	RPM
Include in Programming	True
[-] (Position)	
(Designer Locked)	False
Show Touched	False
X Position	240
Y Position	170
Width	325
Height	144
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
[-] (Show In View)	
Default I/O Animations View	True
[-] (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
[-] Advanced Features	
Visible Condition	Condition Disabled...
List Binding	Binding Disabled...
[-] Data	
Variable	J1939_Engine_Engine_Speed
Variable Unit	RPM
Minimum Value	0.
Maximum Value	6000.
Smoothing	1.
Decimal Places	0
Display Format	Decimal
Divided By	1.
Leading Zeros	0
Smallest Increment	1.
[-] Data Error	
Day Blend Color	<input type="checkbox"/> LightGray
Night Blend Color	<input type="checkbox"/> LightGray
[-] Display Text	
Font Group	Roboto-Regular
Font Height	125
Vertical Alignment	Bottom
Horizontal Alignment	Right
Day	<input type="checkbox"/> WhiteSmoke
Night	<input type="checkbox"/> WhiteSmoke
[-] Drop Shadow	
Show Shadow	False
Shadow Color	<input checked="" type="checkbox"/> Gray
Shadow X Offset	5
Shadow Y Offset	5

[-] Unit Text	
Text String	RPM
Font Group	Roboto-Regular
Font Height	40
Day Color	<input checked="" type="checkbox"/> DeepSkyBlue
Night Color	<input checked="" type="checkbox"/> DeepSkyBlue

Supplemental 4.2.3

Smart Text Widget Properties

- (Name)	
Display Name	STW Engine Status
Group	RPM
- (Position)	
(Designer Locked)	False
Show Touched	False
X Position	596
Y Position	448
Width	145
Height	25
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
- (Show In View)	
Default I/O Animations View	True
- (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
- Advanced Features	
Smart Text Items	Edit Smart Labels...
Visible Condition	Condition Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
- Display Text	
Font Group	Roboto-Regular
Font Height	19
Vertical Alignment	Bottom
Horizontal Alignment	Left
Word Wrap	True
Clip	False
AutoScroll Text	False
Day Color	 MediumSeaGreen
Night Color	 MediumSeaGreen
- Drop Shadow	
Show Shadow	False
Shadow Color	 Gray
Shadow X Offset	5
Shadow Y Offset	5



For the STW Engine Status Widget, Under Advanced Features > Smart Text Items

❑ Click Edit Smart Labels...

The Smart Text Editor window will appear.

❑ For the Selector Variable, choose IO.Digital Output (this is the variable we created for the digital output in the previous steps)

❑ Click the +

❑ Under Description change Enumeration0 to: *Engine Speed Normal*

❑ Under DisplayValue change Enumeration0 to: *NORMAL*

Enumeration Values		
Selector Value	Description	DisplayValue
0	Engine Speed Normal	<u>NORMAL</u>
1	Engine Overspeed	<u>OVERSPEED</u>

❑ Click the + again

❑ Under Description change Enumeration1 to: Engine Overspeed

❑ Under DisplayValue change Enumeration1 to: *OVERSPEED*

❑ Click OK

❑ Now, select the lower right () and the Edit Key Behavior - Key 10 window will appear

❑ For Key Down, Select Fire Event and choose CE Toggle SimData

❑ For Key 2, Assign Key Down and Key Up behaviors to Not Mapped

Create and Load your configuration to test.

When you press the bottom right key (Key 10) you should see:

- the RPM gauge simulating data
- when Engine Speed goes above 3000 RPMs the light should be on
- when Engine Speed goes below or is equal to 3000 RPMs the light should be off

4.3 // Assigning the Digital Input

In the same configuration we have been working in, *PowerVision Essentials Training*

- ☐ Click on the Connections Tab
- ☐ Under the Module Setup pane, Select Digital Input 1
- ☐ Click the Auto Create box.

By clicking auto create, you are creating a variable within PowerVision for Digital Input 1. It should have generated a variable name similar to: *IO.Digital Input 1* and is located in the *Input Output Port Manager* folder in the Programming Tab.

Now let's create a Text Gauge and a Smart Text Widget and use the toggle switch on the display stand to test the Digital Input.

- ☐ Click on the Page Designer Tab
- ☐ Select the I/O Animations Page you created previously
- ☐ From the Toolbox, drag a Text Gauge onto the design canvas
- ☐ Name this Text Gauge: *TG DigIn 1*
- ☐ In the Text Gauge Properties pane, assign it to the variable you created for the Digital Input 1 above (i.e. *IO.Digital Input 1*)
- ☐ Using **Supplemental 4.3.1**, change the Text Gauge Properties
- ☐ From the Toolbox, drag a Smart Text Widget onto the design canvas
- ☐ Name this Text Gauge: *STW DigIn 1*
- ☐ Using **Supplemental 4.3.2**, change the Smart Text Widget Properties



Supplemental 4.3.1

Text Gauge Properties

[-] (Name)

Display Name	TG DigIn 1
Group	IO
Include in Programming	False

[-] (Position)

(Designer Locked)	False
Show Touched	False
X Position	15
Y Position	293
Width	47
Height	46
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0

[-] (Show In View)

Default I/O Animations View	True
-----------------------------	------

[-] (Touch Actions)

Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)

[-] Advanced Features

Visible Condition	Condition Disabled...
List Binding	Binding Disabled...

[-] Data

Variable	IO_Digital_Input_1
Variable Unit	raw
Minimum Value	0.
Maximum Value	6000.
Smoothing	1.
Decimal Places	0
Display Format	Decimal
Divided By	1.
Leading Zeros	0
Smallest Increment	1.

[-] Data Error

Day Blend Color	<input type="checkbox"/> LightGray
Night Blend Color	<input type="checkbox"/> LightGray

[-] Display Text

Font Group	Roboto-Regular
Font Height	35
Vertical Alignment	Center
Horizontal Alignment	Center
Day	<input type="checkbox"/> WhiteSmoke
Night	<input type="checkbox"/> WhiteSmoke

[-] Drop Shadow

Show Shadow	False
Shadow Color	<input checked="" type="checkbox"/> Gray
Shadow X Offset	5
Shadow Y Offset	5

[-] Unit Text

Text String	
Font Group	Default Font Group
Font Height	20
Day Color	<input checked="" type="checkbox"/> Black
Night Color	<input checked="" type="checkbox"/> Black

Supplemental 4.3.2

Smart Text Widget Properties	
- (Name)	
Display Name	STW Digin 1
Group	IO
- (Position)	
(Designer Locked)	False
Show Touched	False
X Position	33
Y Position	296
Width	67
Height	25
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0
- (Show In View)	
Default I/O Animations View	True
- (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
- Advanced Features	
Smart Text Items	Edit Smart Labels...
Visible Condition	Condition Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
- Display Text	
Font Group	Roboto-Regular
Font Height	15
Vertical Alignment	Center
Horizontal Alignment	Center
Word Wrap	True
Clip	False
AutoScroll Text	False
Day Color	<input type="checkbox"/> WhiteSmoke
Night Color	<input type="checkbox"/> WhiteSmoke
- Drop Shadow	
Show Shadow	False
Shadow Color	<input checked="" type="checkbox"/> Gray
Shadow X Offset	5
Shadow Y Offset	5





Under Advanced Features > Smart Text Items,

☐ Click Edit Smart Labels...

The Smart Text Editor window will appear.

☐ For the Selector Variable, choose IO.Digital Input 1 (this is the variable we created for the digital input in the previous steps)

☐ Click the +

☐ Under Description change Enumeration0 to: DigIn Off

☐ Under DisplayValue change Enumeration0 to: *OFF*

Selector Value	Description	DisplayValue
0	DigIn Off	OFF
1	DigIn On	ON

☐ Click the + again

☐ Under Description change Enumeration1 to: DigIn On

☐ Under DisplayValue change Enumeration1 to: *ON*

☐ Click OK

Create and Load your configuration to test.

When you toggle the switch in the up position you should see:

- the Digital Input 1 gauge display a 1
- the STW DigIn 1 will display ON

When you toggle the switch in the middle position you should see:

- the Digital Input 1 gauge display a 0
- the STW DigIn 1 will display OFF

4.4 // Assigning the Analog Input

In the same configuration we have been working in, *PowerVision Essentials Training*

- ☐ Click on the Connections Tab
- ☐ Under the Module Setup pane, Select Analog Input 1
- ☐ Click the Auto Create box

By clicking auto create, you are creating a variable within PowerVision for Analog Input 1. It should have generated a variable name similar to: *IO.Analog Input 1.Selector* and is located in the *Input Output Port Manager* folder in the Programming Tab.

Now that we have created a variable for Analog Input 1, we need to create a definition for this Input.

- ☐ Click on the Library Tab
- ☐ Now click on the IO Definitions Tab
- ☐ In the IO Definitions pane, click the +
- ☐ For the Variable Name select, *IO.Analog Input 1.Selector* (This is the variable we created from the previous steps)
- ☐ For Operation Mode select, *Analog In: Resistive 400 ohms pull-up*
- ☐ For Sample Count: 1
- ☐ For Sample Rate: 200
- ☐ For Selected Curve: (No Curve)

Next we need to go back to the Connections Tab and assign this definition to Analog Input 1.

- ☐ Click on the Connections Tab
- ☐ Select Analog Input 1
- ☐ Click on Add Definition, the IO Library window will appear
- ☐ Check the box for Analog Input 1 (This is the name of the IO Definition we created in the previous steps)
- ☐ Click OK



Let's create a Text Gauge and use the POT Switch on the display stand to test the Analog Input.

- ☐ Click on the Page Designer Tab
- ☐ Select the I/O Animations page
- ☐ From the Toolbox, drag a Text Gauge onto the design canvas
- ☐ Name this Text Gauge: *TG Analog In 1*
- ☐ In the Text Gauge Properties pane, assign it to the variable you created for the Analog Input 1 above (i.e. *IO.Analog Input 1.Selector*)
- ☐ Using **Supplemental 4.4.1**, change the Text Gauge Properties

Create and Load your configuration to test.

When you turn the POT switch you should see:

- the TG Analog In 1 gauge display the input values

Supplemental 4.4.1

Text Gauge Properties

≡ (Name)

Display Name	TG Analog In 1
Group	IO
Include in Programming	False

≡ (Position)

(Designer Locked)	False
Show Touched	False
X Position	9
Y Position	176
Width	75
Height	41
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0

≡ (Show In View)

Default I/O Animations View	True
-----------------------------	------

≡ (Touch Actions)

Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)

≡ Advanced Features

Visible Condition	Condition Disabled...
List Binding	Binding Disabled...

≡ Data

Variable	IO Analog Input 1 Selector
Variable Unit	raw
Minimum Value	0.
Maximum Value	6000.
Smoothing	1.
Decimal Places	0
Display Format	Decimal
Divided By	1.
Leading Zeros	0
Smallest Increment	1.

≡ Data Error

Day Blend Color	<input type="checkbox"/> LightGray
Night Blend Color	<input type="checkbox"/> LightGray

≡ Display Text

Font Group	Roboto-Regular
Font Height	35
Vertical Alignment	Center
Horizontal Alignment	Center
Day	<input type="checkbox"/> WhiteSmoke
Night	<input type="checkbox"/> WhiteSmoke

≡ Drop Shadow

Show Shadow	False
Shadow Color	<input checked="" type="checkbox"/> Gray
Shadow X Offset	5
Shadow Y Offset	5

≡ Unit Text

Text String	
Font Group	Default Font Group
Font Height	20
Day Color	<input checked="" type="checkbox"/> Black
Night Color	<input checked="" type="checkbox"/> Black

4.5 // Assigning the Battery Voltage Input

In the same configuration we have been working in, *PowerVision Essentials Training*

- ☐ Click on the Connections Tab
- ☐ Under the Module Setup pane, Select Battery Voltage 1
- ☐ Click the Auto Create box

By clicking auto create, you are creating a variable within PowerVision for Battery Voltage 1. It should have generated a variable name similar to: *IO.Battery Voltage 1* and is located in the *Input Output Port Manager* folder in the Programming Tab.

Now let's create a Text Gauge to test the Battery Voltage Input.

- ☐ Click on the Page Designer Tab
- ☐ Select the I/O Animations page
- ☐ From the Toolbox, drag a Text Gauge onto the design canvas
- ☐ Name this Text Gauge: *TG Battery Voltage*
- ☐ In the Text Gauge Properties pane, assign it to the variable you created for the Battery Voltage 1 Input above (i.e. *IO.Battery Voltage 1*)
- ☐ Using **Supplemental 4.5.1**, change the Text Gauge Properties

Supplemental 4.5.1

Text Gauge Properties

(Name)

Display Name	TG Battery Voltage
Group	IO
Include in Programming	False

(Position)

(Designer Locked)	False
Show Touched	False
X Position	13
Y Position	54
Width	61
Height	44
Rotation	0
Rotation Pin X	0
Rotation Pin Y	0

(Show In View)

Default I/O Animations View	True
-----------------------------	------

(Touch Actions)

Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)

Advanced Features

Visible Condition	Condition Disabled...
List Binding	Binding Disabled...

Data

Variable	IO Battery Voltage 1
Variable Unit	raw
Minimum Value	0.
Maximum Value	12.
Smoothing	1.
Decimal Places	0
Display Format	Decimal
Divided By	1.
Leading Zeros	0
Smallest Increment	1.

Data Error

Day Blend Color	<input type="checkbox"/> LightGray
Night Blend Color	<input type="checkbox"/> LightGray

Display Text

Font Group	Roboto-Regular
Font Height	35
Vertical Alignment	Center
Horizontal Alignment	Center
Day	<input type="checkbox"/> WhiteSmoke
Night	<input type="checkbox"/> WhiteSmoke

Drop Shadow

Show Shadow	False
Shadow Color	<input checked="" type="checkbox"/> Gray
Shadow X Offset	5
Shadow Y Offset	5

Unit Text

Text String	V
Font Group	Roboto-Regular
Font Height	15
Day Color	<input type="checkbox"/> WhiteSmoke
Night Color	<input type="checkbox"/> WhiteSmoke



Create and Load your configuration to test.

When accessing the I/O Animations page from the display:

- the TG Battery Voltage gauge will show the voltage coming into the display

Now that we have everything placed on the design canvas where we want it, select the IO folder. It should highlight everything that is in that folder.

In the Multiple Gauge Properties pane:

☐ Change Designer Locked to: True

Now everything in the IO folder is locked onto the design canvas.



ANIMATION

“KNOWLEDGE WILL GIVE YOU POWER, BUT
CHARACTER RESPECT.”

BRUCE LEE

5

- Programming Animations
- Copy / Paste Components Between Configurations
- Creating a Pop-Out Menu
- Using Timers
- Creating Pageviews
- Creating State Machines
- Creating Activity Programs
- Firing on Change Events
- Creating User Events

5.1 // Using Animation

PowerVision allows users to:

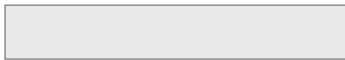
- Animate Alpha
- Animate Color
- Animate Position
- Animate Rotation
- Animate Scale

Using animations in the design of a configuration can drastically enhance the user interface and overall user experience. We are going to walk through using animations to add some additional UI features to our configuration.

Animating Position for a PopOut Menu

First we need to create a menu that we can program to pop out. For time's sake, we have already created a PopOut menu for you.

- ☐ Open the configuration we have been working on: *PowerVision Essentials Training*
- ☐ Go to the Page Designer Tab and select the I/O Animations Page
- ☐ From your flash drive, also open the Configuration: *Section 5* (you should now have two PowerVision windows open)
- ☐ Go to the Page Designer Tab
- ☐ In the Main Layer, in the Menu folder, select the CW PopOut Menu Container
- ☐ Right click and select Copy



- ☐ Go to the configuration that you have been working on, *PowerVision Essential Training*
- ☐ Go to the Page Designer Tab
- ☐ Select the I/O Animations Page
- ☐ Right click on the Design Canvas and select Paste

This should have placed the CW PopOut Menu onto the I/O Animations Page we have been working on.

- ☐ Select the CW PopOut Menu

In the Container Widget Properties pane:

- ☐ Change Include in Programming to: True (this enables us to access this container when we program it to animate)
- ☐ X Position: -15
- ☐ Y Position: -15

Your CW PopOut Menu should be covering the IO gauges that we created in the previous steps.

Let's go ahead and assign touch actions to this PopOut Menu that will allow us to go to the pages we created, simulate data and navigate to a new page, System Overview. We will create the System Overview Page first.

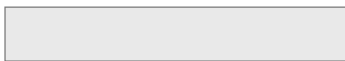
Create System OverView Page

- ☐ Go to the Page Designer Tab
- ☐ Select the I/O Animations Page
- ☐ Under the Design Canvas, right click on the tab: Default I/O Animations View
- ☐ Select Duplicate View
- ☐ Select this new tab and above the design canvas, rename the Current View: System Overview Page

We are going to copy and paste a container widget onto the new page so we need to ensure that we have all the J1939 parameters mapped.

- ☐ Go to the Connections Tab
- ☐ Under Communication Ports > CANPort1, Select Engine Device
- ☐ To the right, make sure J1939/NMEA Parameter Mapping tab is selected
- ☐ Click the + to add more parameters
- ☐ A new window will appear, check the (Select All) box
- ☐ Click OK
- ☐ Open the configuration called *Section 5* from your flash drive (which we just used)
- ☐ Go to the Page Designer Tab
- ☐ In the Main Layer under the Main Page, select to expand the System Overview folder
- ☐ Select the CW System Overview container
- ☐ Right click and select Copy
- ☐ Go back to the configuration we have been working on, PowerVision Essentials Training
- ☐ In the new page view you created above, right click and paste the CW System Overview container in the System Overview Page





Assign Touch Actions to the Menu

- ☐ Go back to the Default I/O Animations View
- ☐ Double-click on the CW PopOut Menu container
- ☐ The Edit CW PopOut Menu window will appear
- ☐ Select the Basic Image
- ☐ In the Image Widget Properties pane under Touch Action, change to Go to View: (This Layer).Basic Page Designer View
- ☐ Click OK

- ☐ Select the Graphics Image
- ☐ In the Image Widget Properties pane under Touch Action, change to Go to View: (This Layer).Default Graphics View
- ☐ Click OK

- ☐ Select the I/O Image
- ☐ In the Image Widget Properties pane under Touch Action, change to Go to View: (This Layer).Default I/O Animations View
- ☐ Click OK

- ☐ Select the System Overview Image
- ☐ In the Image Widget Properties pane under Touch Action, change to Go to View: (This Layer).System Overview Page
- ☐ Click OK

REMEMBER

*Make sure Show Advanced is
 selected in the properties bar.*

Animate the PopOut Menu

To animate this PopOut Menu container we will use an action built into PowerVision called AnimatePosition. We will need to take note of the start position X,Y values and the end position X,Y values of the IW PopOut Menu.

For this example when the CW PopOut Menu is fully out the X Position = -15 and the Y Position = -15. When the CW PopOut Menu is hidden, the Y position stays the same at -15 and the X position will be -111. So let's take note of these values:

IW PopOut Menu Hidden

X Position: -111

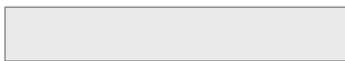
Y Position: -15

IW PopOut Menu Out

X Position: -15

Y Position: -15





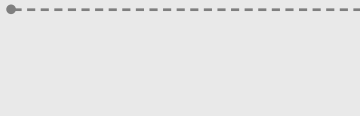
Programming the PopOut Menu Using a State Machine

Now we are going to go program the animation functionality. We can do this multiple ways, but for this exercise we will use a State Machine.

- ☐ Click on the Programming Tab
- ☐ In the Programming Items pane, click the +
- ☐ Select New State Machine
- ☐ Change the State Machine Name to: *Animate Menu*
- ☐ Change the Group Name to: *_Animations*
- ☐ Select the box, Initial State
- ☐ To the right of the State Machine Diagram, change the Name from Initial State to: Menu Hidden
- ☐ In the State Machine Diagram pane, click and drag a blue rectangle onto the diagram canvas (this creates another state)
- ☐ Change the name of this New State to: *Menu Out*

TIP

In State Machines the Initial State always happens on start-up. So for this situation we want the menu to be hidden on start-up, therefore, we make it our initial state.

- ☐ Select the Menu Hidden state
- ☐ To the right, in the *On entering state execute these actions*, click the +
- ☐ Select Screen Application (Screen) > AnimatePosition
- ☐ Change the Data to: 

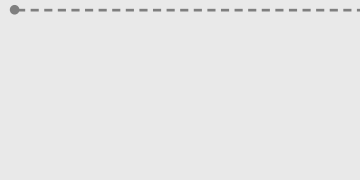
Data	
- (Target)	
Screen Object	//O Animations Page.CW PopOut Menu Cont...
- Expression Values	
X Expression	-111
Y Expression	-15
- Timing	
Animation Factor	Fast Response
Animation Style	FastInAccelerator
Complete Event	<Disabled>
Occurs X Times	40

(Target) - Screen Object

Screen Item being moved.

☐ Click OK

- ☐ Click the + again
- ☐ Select Screen Application (Screen) > Process > (Empty)
- ☐ Click OK

- ☐ Select the Menu Out state
- ☐ To the right, in the *On entering state execute these actions*, click the +
- ☐ Select Screen Application (Screen) > AnimatePosition
- ☐ Change the Data to: 

Data	
- (Target)	
Screen Object	//O Animations Page.CW PopOut Menu Cont...
- Expression Values	
X Expression	-15
Y Expression	-15
- Timing	
Animation Factor	Fast Response
Animation Style	FastInAccelerator
Complete Event	<Disabled>
Occurs X Times	40

(Target) - Screen Object


Screen Item being moved.

☐ Click OK


- ☐ Click the + again
- ☐ Select Screen Application (Screen) > Process > (Empty)
- ☐ Click OK



Now we need to create transitions from one state to the other.

- ☐ Click on the transition icon ()
- ☐ Hover your mouse over the Menu Hidden state
- ☐ Click and Hold, drag your mouse to the Menu Out state (this creates a transition from the Menu Hidden state to the Menu Out state)
- ☐ Click on this new transition:
 - ☐ Make sure the Auto Create box is checked
 - ☐ Change the Name to: Toggle Menu
- ☐ Follow that same process to create a transition from the Menu Out state to the Menu Hidden state
- ☐ Click on this new transition:
 - ☐ Make sure the Auto Create box is not checked
 - ☐ Next to Name, click <Disabled>
 - ☐ Select Toggle Menu from the list
 - ☐ Click OK

Now we need to go back to our Animation Page and assign a key press to fire the Toggle Menu Event.

- ☐ Click on the Page Designer Tab
- ☐ Select the bottom left most key () and the Edit Key Behavior - Key 9 window will appear
- ☐ For Key Down, Select Fire Event and choose Toggle Menu

Create and Load your configuration to test.

When accessing the Animation Page:

- the bottom left key will toggle the CW PopOut Menu
- while the CW PopOut Menu is out you should be able to touch the various menu items and see them navigate to appropriate page views

Let's program a timer on the PopOut Menu so you can not only toggle (what we did in the previous steps) but also so the PopOut Menu will automatically hide after a certain amount of time.

- ☐ Click on the Programming Tab
- ☐ Select the *Animate Menu* State Machine we created in the previous steps
- ☐ Select the Toggle Menu transition
- ☐ In the Toggle Menu pane to the right, select the Timers Tab
- ☐ Click the +
- ☐ Click on the Name and change to: Menu Auto Hide
- ☐ Make sure the timer is a One Shot timer (because this is a One Shot timer and not a Recurring Timer, we will have to fire an event to start this timer (It will not happen automatically))
- ☐ Click on the duration and change to 6000 ms
- ☐ Make sure the High Speed Timer box is not checked

Now we need to fire an event to start the timer that we just created.

- ☐ Select the Menu Out state (Blue Rectangle)
- ☐ To the right, in the *On entering state execute these actions*, click the +
- ☐ Select Central Control Module (CCM) > Start Timer > Menu Auto Hide
- ☐ Click OK

Create and Load your configuration to test.

When accessing the I/O Animations Page:

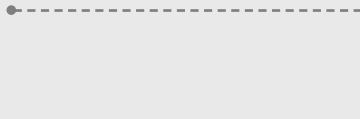
- the bottom left key will toggle the PopOut Menu
- when the PopOut Menu is shown, it will automatically hide after 6 seconds



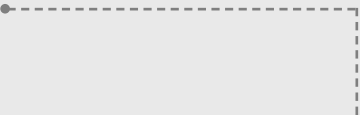
5.2 // Animating Scale and Position

Let's animate the scale and position of the Engine Speed gauge we created previously (ref. section 4.2) so that when we navigate to the System Overview Page the Engine Speed gauge will animate out of the way. This will allow the user to still see critical engine information even when in a Menu / Overview page.

Animate the Scale and Position of the TG RPM Gauge

- ☐ Click on the Programming Tab
- ☐ In the Programming Items pane, click the +
- ☐ Select New State Machine
- ☐ Change the State Machine Name to: *Animate RPM*
- ☐ Change the Group Name to: *_Animations*
- ☐ Select the box Initial State
- ☐ To the right of the State Machine Diagram, change the Name from Initial State to: *RPM Large*
- ☐ In the State Machine Diagram pane, click and drag a blue rectangle onto the diagram canvas (this creates another state)
- ☐ Change the name of this New State to: *RPM Small*
- ☐ Select the RPM Large state
- ☐ To the right, in the *On entering state execute these actions*, click the +
- ☐ Select Screen Application (Screen) > AnimatePosition
- ☐ Change the Data to: 
- ☐ Click OK

Data	
- (Target)	
Screen Object	I/O Animations Page.TG RPM
- Expression Values	
X Expression	230
Y Expression	173
- Timing	
Animation Factor	Fast Response
Animation Style	FastInAccelerator
Complete Event	No Value
Occurs X Times	25
(Target) - Screen Object Screen Item being moved.	

- ☐ Click the + again
- ☐ Select Screen Application (Screen) > AnimateScale
- ☐ Change the Data to: 

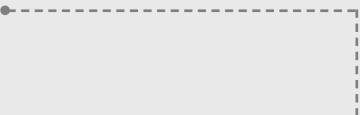
☐ Click OK

Data	
- (Target)	
Screen Object	I/O Animations Page.TG RPM
- Expression Values	
Scale X Expression	1
Scale Y Expression	1
- Timing	
Animation Factor	Fast Response
Animation Style	FastInAccelerator
Complete Event	No Value
Occurs X Times	25

(Target) - Screen Object

Screen Item being moved.

- ☐ Click the + again
- ☐ Select Screen Application (Screen) > Process > (Empty)
- ☐ Click OK

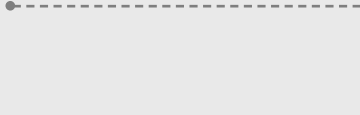
- ☐ Now select the RPM Small state
- ☐ To the right, in the *On entering state execute these actions*, click the +
- ☐ Select Screen Application (Screen) > AnimatePosition
- ☐ Change the Data to: 
- ☐ Click OK

Data	
- (Target)	
Screen Object	I/O Animations Page.TG RPM
- Expression Values	
X Expression	439
Y Expression	421
- Timing	
Animation Factor	Fast Response
Animation Style	FastInAccelerator
Complete Event	No Value
Occurs X Times	25

(Target) - Screen Object

Screen Item being moved.




- ☐ Click the + again
- ☐ Select Screen Application (Screen) > AnimateScale
- ☐ Change the Data to: 
- ☐ Click OK
- ☐ Click the + again
- ☐ Select Screen Application (Screen) > Process > (Empty)
- ☐ Click OK

Data	
- (Target)	
Screen Object	I/O Animations Page.TG RPM
- Expression Values	
Scale X Expression	.338
Scale Y Expression	.333
- Timing	
Animation Factor	Fast Response
Animation Style	FastInAccelerator
Complete Event	No Value
Occurs X Times	25

(Target) - Screen Object	
Screen Item being moved.	

Now we need to create transitions from one state to the other.

- ☐ Click on the transition icon ()
- ☐ Hover your mouse over the RPM Large state
- ☐ Click and drag your mouse to the RPM Small state (this creates a transition from the RPM Large state to the RPM Small state)
- ☐ Click on this new transition:
 - ☐ Make sure the Auto Create box is checked
 - ☐ It should have automatically created a name: *RPM Large to RPM Small*
- ☐ Follow that same process to create a transition from the RPM Small state to the RPM Large state
- ☐ Click on this new transition:
 - ☐ Make sure the Auto Create box is checked
 - ☐ It should have automatically created a name: *RPM Small to RPM Large*

Now we need to fire the two Events that we created in order to animate the RPM Gauge.

- ☐ Click on the Page Designer Tab
- ☐ Select the I/O Animations Page
- ☐ Open the CW PopOut Menu container
- ☐ The Edit CW PopOut Menu window will appear
- ☐ Click on the I/O Image in the design area
- ☐ In the Image Widget Properties pane, under Touch Actions:
 - ☐ Select Touch Action
 - ☐ Clear Transition
 - ☐ Select Touch Action - Start
 - ☐ Select Go To View...
 - ☐ Select (This Layer).Default I/O Animations View
 - ☐ Click OK

 - ☐ Select Touch Action - Release
 - ☐ Select Fire an Event...
 - ☐ Select RPM Small to RPM Large
 - ☐ Click OK


REMEMBER

Make sure Show Advanced is selected in the properties bar.



- ☐ Keep the CW PopOut Menu container open
- ☐ Click on the System Overview Image in the design area
- ☐ In the Image Widget Properties pane, under Touch Actions:
 - ☐ Select Touch Action
 - ☐ Clear Transition
 - ☐ Select Touch Action - Start
 - ☐ Select Fire an Event...
 - ☐ Select RPM Large to RPM Small
 - ☐ Click OK

 - ☐ Select Touch Action - Release
 - ☐ Select Go To View...
 - ☐ Select (This Layer).System Overview Page
 - ☐ Click OK

 - ☐ Click the X in the upper right corner to close the Edit CW PopOut Menu window
- ☐ Select Key 10 () and the Edit Key Behavior - Key 10 window will appear
- ☐ For Key Down, Select Fire Event and choose CE Toggle SimData

REMEMBER

Make sure Show Advanced is selected in the properties bar.

Create and Load your configuration to test.

When accessing the I/O Animations Page:

- The bottom left key will toggle the PopOut Menu
- When the PopOut Menu is shown, it will automatically hide after 6 seconds
- When you navigate to the System Overview Page, the RPM Gauge should animate its scale and position
- When you navigate to the I/O Animations Page, the RPM Gauge should animate to its original scale and position
- Key 10 will turn Simulation Mode on and off

5.3 // Animating Rotation

Let's animate the rotation of an Image Widget that we will program to function when the Digital Input switch is in the on position.

- ☐ Open the configuration we have been working on: *PowerVision Essentials Training*
- ☐ Go to the Page Designer Tab and select the I/O Animations Page
- ☐ Drag an Image Widget onto the design canvas
- ☐ Name this Image Widget: IW Gear Right
- ☐ In the Image Widget Properties pane, select *gear_white* for the Day and Night Images
- ☐ Using **Supplemental 5.3.1**, change the Image Properties

- ☐ Drag another Image Widget onto the design canvas
- ☐ Name this Image Widget: IW Gear Left
- ☐ In the Image Widget Properties pane, select *gear_white* for the Day and Night Images
- ☐ Using **Supplemental 5.3.2**, change the Image Properties

Supplemental 5.3.1

Image Widget Properties

(Name)

Display Name	IW Gear Right
Group	Animation
Include in Programming	True

(Position)

(Designer Locked)	False
Show Touched	False
X Position	749
Y Position	402
Width	40
Height	40
Rotation	0
Rotation Pin X	20
Rotation Pin Y	20

(Show In View)

Default I/O Animations View	True
System Overview Page	True

(Touch Actions)

Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)

Advanced Features

Visible Condition	Condition Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...

Image

Day Image	<input type="checkbox"/> gear_white
Night Image	<input type="checkbox"/> gear_white
Stretch Image	False

Supplemental 5.3.2

Image Widget Properties	
- (Name)	
Display Name	IW Gear Left
Group	Animation
Include in Programming	True
- (Position)	
(Designer Locked)	False
Show Touched	False
X Position	719
Y Position	430
Width	40
Height	40
Rotation	0
Rotation Pin X	20
Rotation Pin Y	20
- (Show In View)	
Default I/O Animations View	True
System Overview Page	True
- (Touch Actions)	
Touch Action	(Not Mapped)
Touch Action - Start	(Not Mapped)
Touch Action - Continue	(Not Mapped)
Touch Action - Release	(Not Mapped)
- Advanced Features	
Visible Condition	Condition Disabled...
Background Primitives	Edit Primitives...
Foreground Primitives	Edit Primitives...
- Image	
Day Image	<input type="checkbox"/> gear_white
Night Image	<input type="checkbox"/> gear_white
Stretch Image	False



- ☐ Now go to the Programming Tab
- ☐ Select the _Animations folder and click the +
- ☐ Select New Activity Program
- ☐ Rename this Activity Program: *Animate Gears*
- ☐ Click and drag a MultiDecision Branch icon (4-way green arrows) onto the canvas
- ☐ In the MultiDecision Properties pane to the right, for the Variable select *IO.Digital Input 1*
- ☐ Under Switch Outputs, click the +
- ☐ For Output 1
 - ☐ Click Constant Value and type: *0*
 - ☐ Click Description and type: *DigIn Off*
- ☐ Click the + again
- ☐ For Output 2,
 - ☐ Click Constant Value and type: *1*
 - ☐ Click Description and type: *DigIn On*
- ☐ Now Drag a Fire Actions icon (blue rectangle) onto the canvas
- ☐ In the Fire Actions Properties pane to the right, next to Execute These Actions, click the +
- ☐ Select Screen Application (Screen) > AnimateRotation
- ☐ Enter these values for Data

•-----

- ☐ Click OK

Data	
[-] (Target)	
Screen Object	I/O Animations Page.IW Gear Left
[-] Expression Values	
Rotation Expression	Rotation +45
[-] Timing	
Animation Factor	Fast Response
Animation Style	Linear
Complete Event	Animate Gears Event
Occurs X Times	10

(Target) - Screen Object
 Screen Item being moved.

- ☐ Click the + again
- ☐ Select Screen Application (Screen) > AnimateRotation
- ☐ Enter these values for Data
- ☐ Click OK

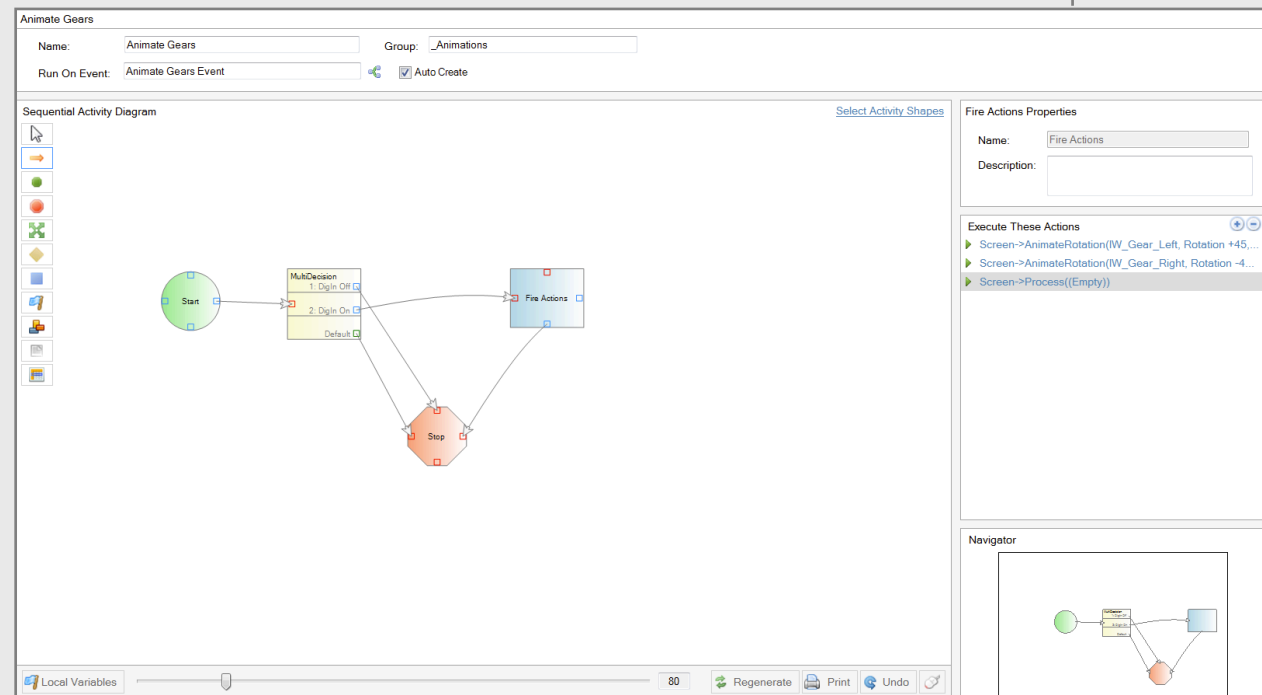
Data	
[-] (Target)	
Screen Object	I/O Animations Page.IW Gear Right
[-] Expression Values	
Rotation Expression	Rotation -45
[-] Timing	
Animation Factor	Fast Response
Animation Style	Linear
Complete Event	No Value
Occurs X Times	10

(Target) - Screen Object
 Screen Item being moved.

- ☐ Click the + again
- ☐ Select Screen Application (Screen) > Process > (Empty)
- ☐ Click OK

- ☐ Now Drag a Stop icon onto the canvas
- ☐ Click the Control Flow icon (yellow-orange arrow), and create flow between the different items.

You should have an Activity Program that looks similar to this:



- ☐ In the Programming Tab
- ☐ Under Programming Items, Select / expand the *Input Output Port Manager* folder
- ☐ Select *IO.Digital Input 1*
- ☐ Click on <Disabled> next to Fire on change
- ☐ Select Animate Gears Event (this is the Activity Program that we just created)
- ☐ Go back to the Page Designer Tab

Create and Load your configuration to test.

When accessing the I/O Animations Page:

- Switching the Digital Input into the up position will now animate the gears in the upper right corner of the screen



DESIGN PAD

"THE ATTEMPT TO COMBINE WISDOM AND
POWER HAS ONLY RARELY BEEN SUCCESSFUL
AND THEN ONLY FOR A SHORT WHILE."

ALBERT EINSTEIN



Example of Mock-up

PV780

PV480

PV450

PV380

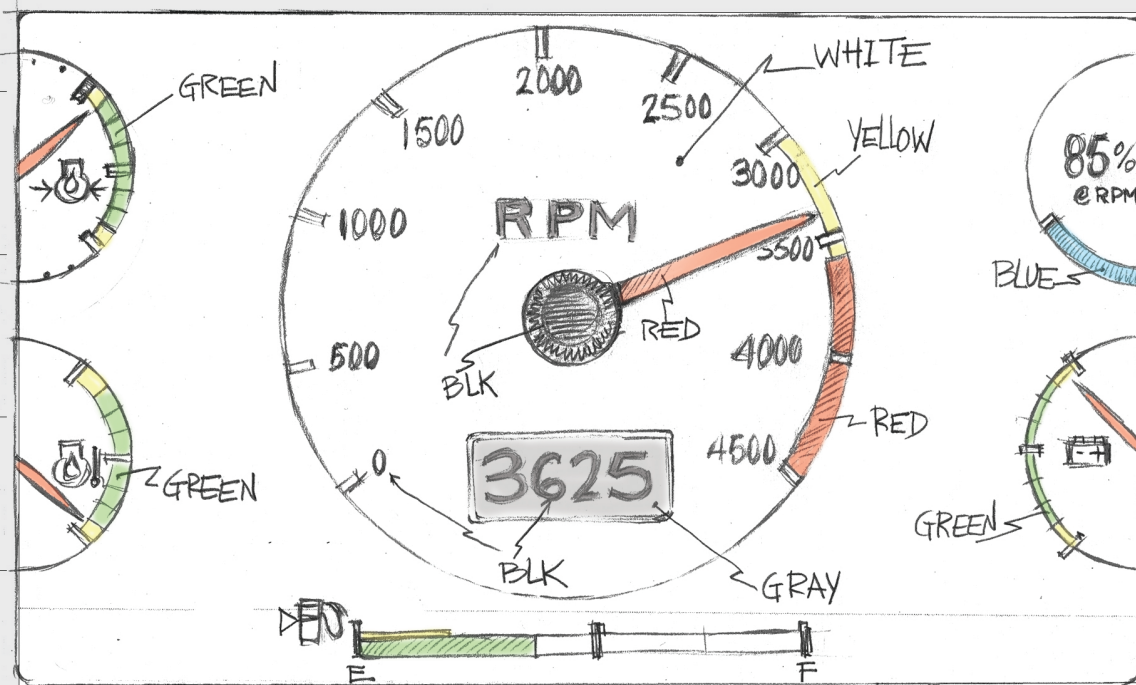
Graph Paper

MONITOR:

- ☐ RPM
- ☐ OIL PRESSURE
- ☐ LOAD/RPM
- ☐ COOLANT TEMP
- ☐ FUEL LEVEL
- ☐ BATT. VOLTAGE

TOGGLE
DAY/NIGHTSCROLL PREV
PAGE

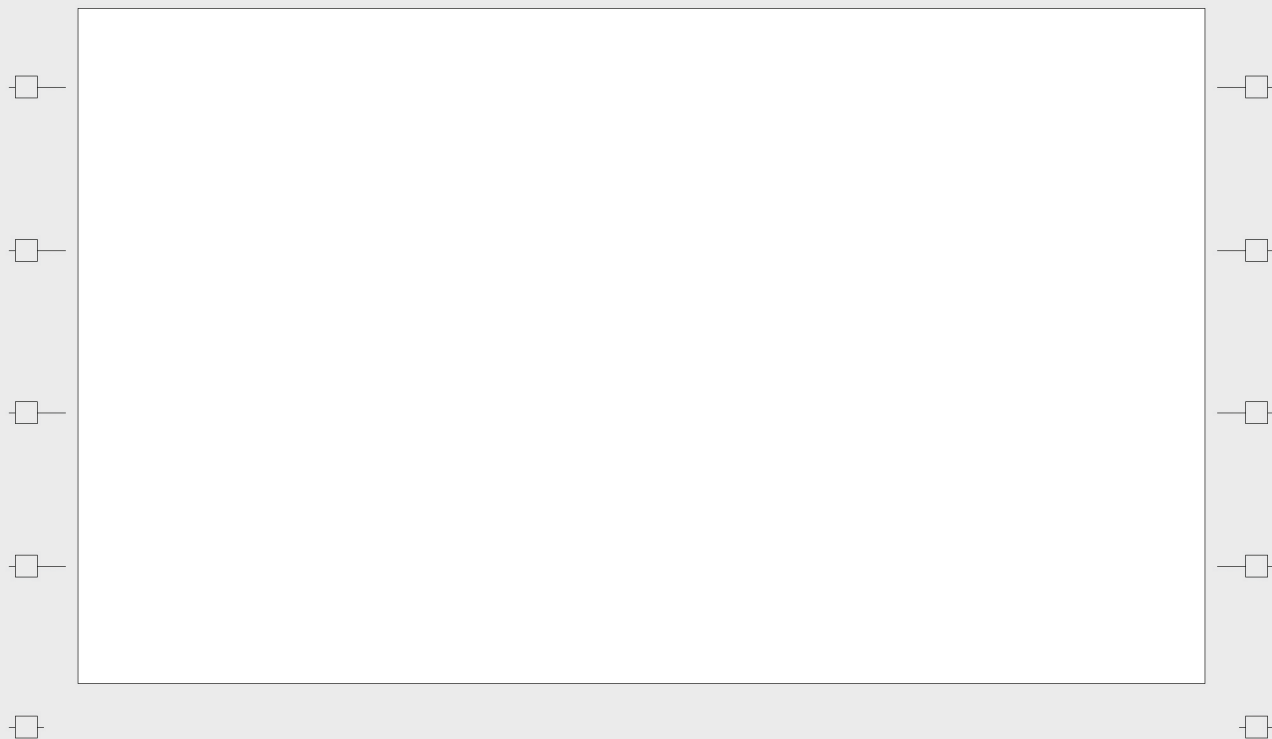
MENU

TOGGLE
SIM DATASCROLL NEXT
PAGEFUEL BAR CHANGE TO
RED BELOW 15%

REFERENCE

PV780 - 800 X 480 PIXELS

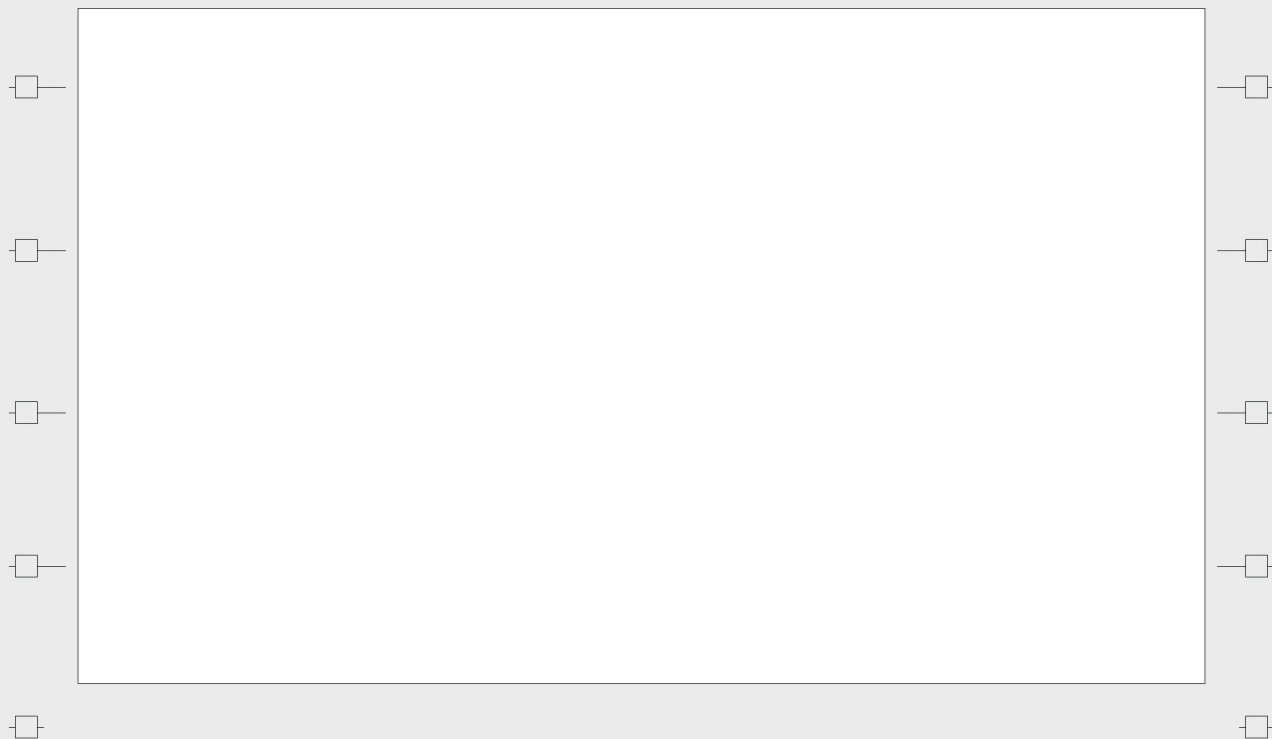
DATE



REFERENCE

PV780 - 800 X 480 PIXELS

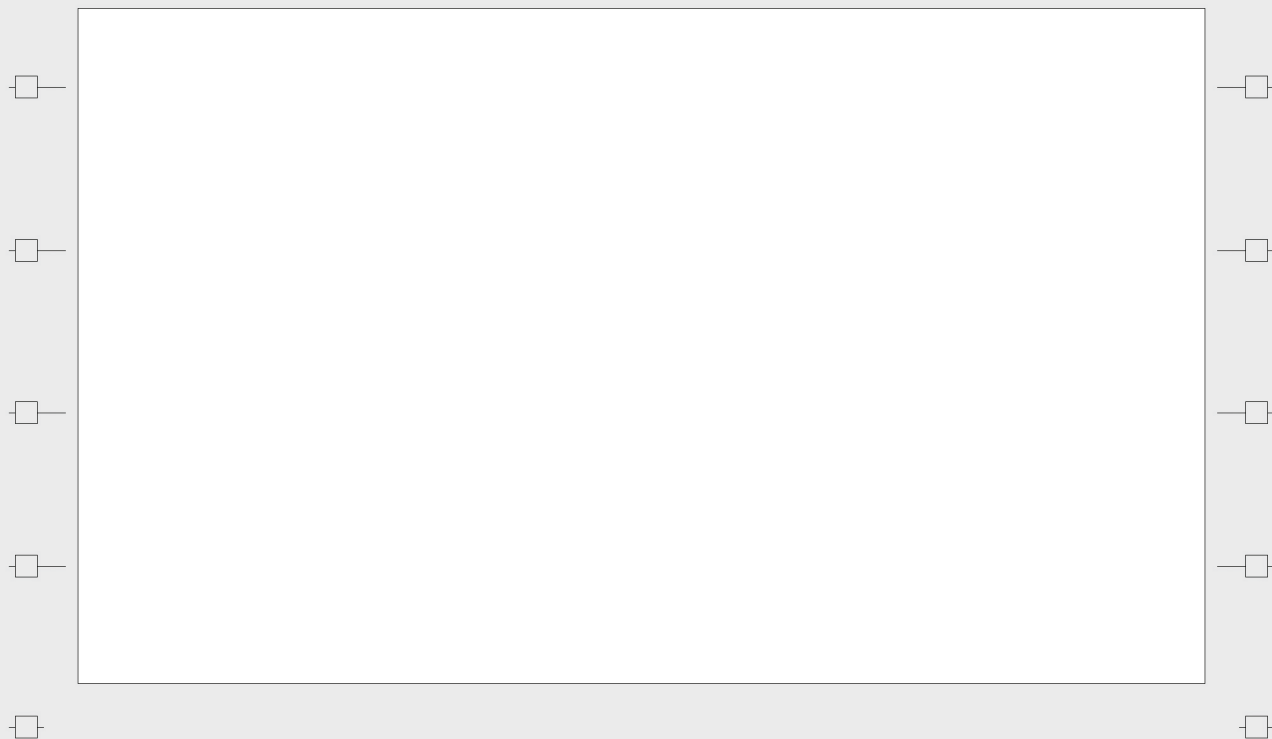
DATE



REFERENCE

PV780 - 800 X 480 PIXELS

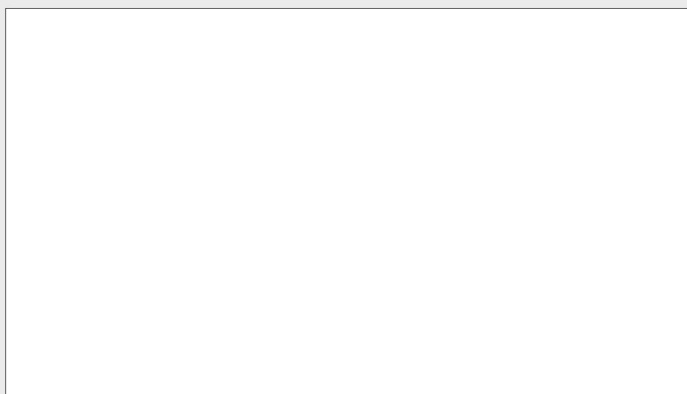
DATE



REFERENCE

PV480 - 480 X 272 PIXELS

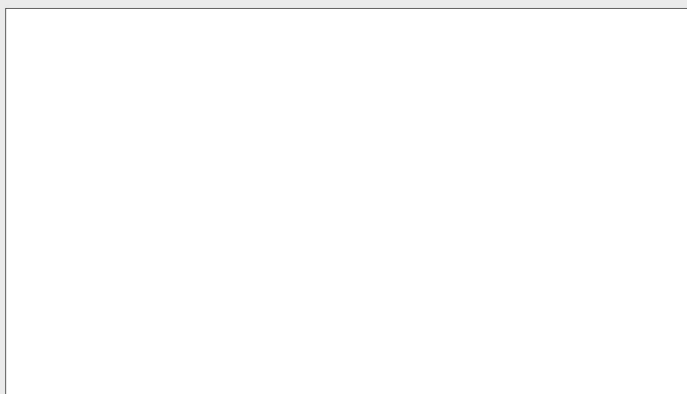
DATE



REFERENCE

PV480 - 480 X 272 PIXELS

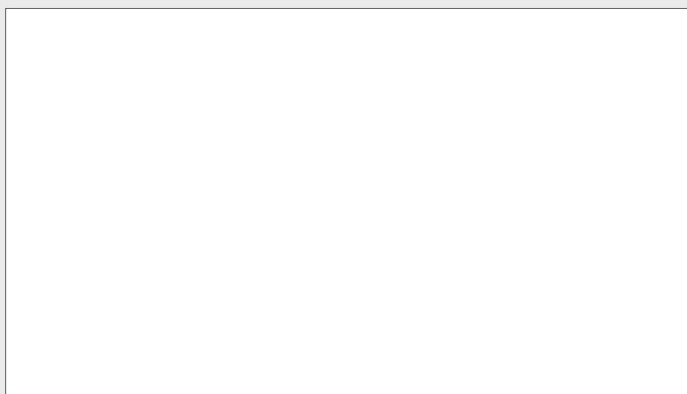
DATE



REFERENCE

PV480 - 480 X 272 PIXELS

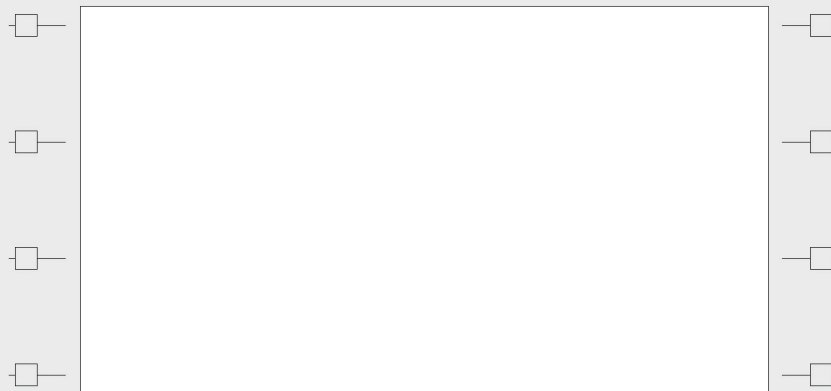
DATE



REFERENCE

PV450 - 480 X 272 PIXELS

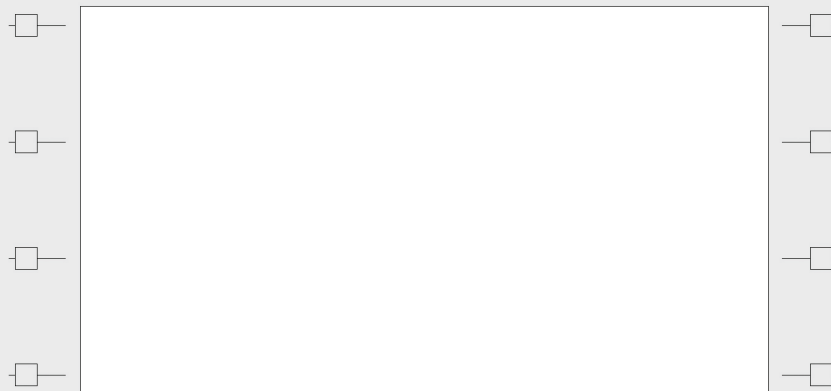
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REFERENCE

PV450 - 480 X 272 PIXELS

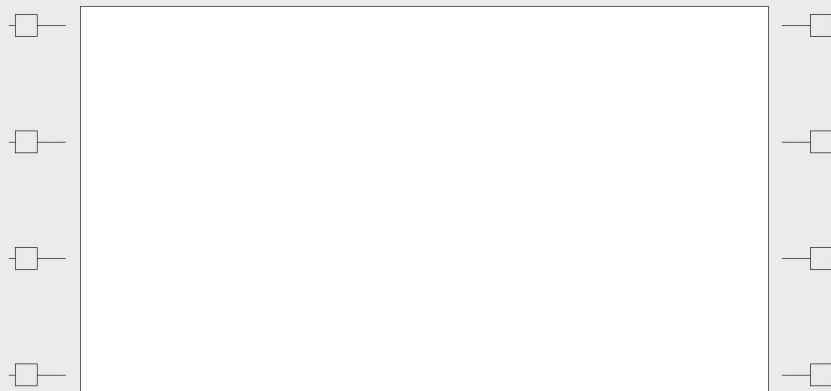
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REFERENCE

PV450 - 480 X 272 PIXELS

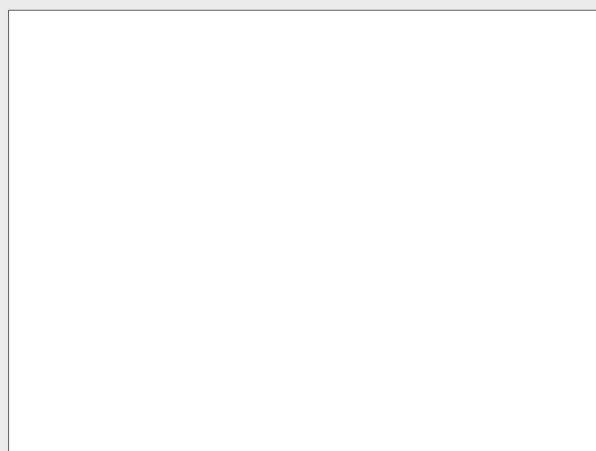
DATE



REFERENCE

PV380 - 320 X 240 PIXELS

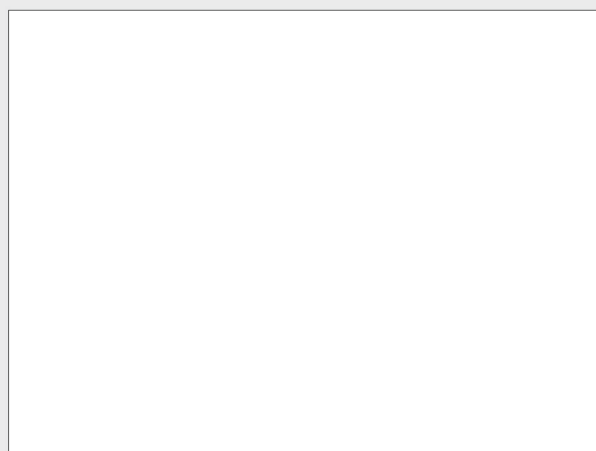
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REFERENCE

PV380 - 320 X 240 PIXELS

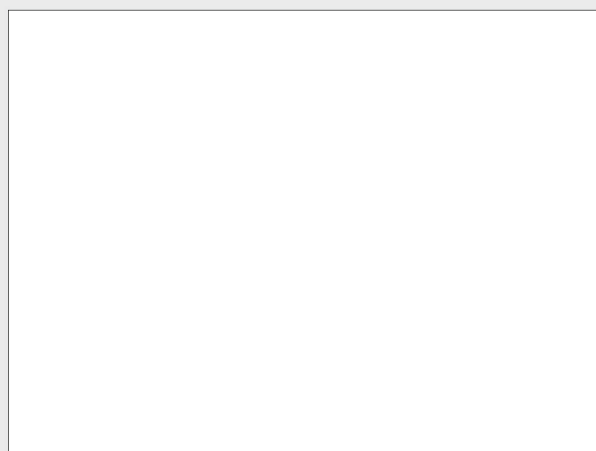
DATE



REFERENCE

PV380 - 320 X 240 PIXELS

DATE



REFERENCE

DATE _____

REFERENCE

DATE _____

REFERENCE

DATE _____

POWERSHOP CONFIGURATION STUDIO®

NAMING CONVENTIONS

WIDGETS

AW — Application Widget
CW — Container Widget
EW — Ellipse Widget
IW — Image Widget
KW — Keyboard Widget
MNW — Menu Widget
MPW — Map Widget
RW — Rectangle Widget
STW — Smart Text Widget
TW — Text Widget
TCW — Touch Widget
VW — Video Widget
SIW — Smart Image Widget

EVENTS

SCE — Script Event
CE — Calculation Event
EC — Event Condition
TR — Transition
UE — User Event

GAUGES

BG — Bar Gauge
CBG — Curved Bar Gauge
RG — Rotary Gauge
TG — Text Gauge
STG — Smart Text Gauge
SRG — Smart Rotary Gauge

PROGRAMMING

VAR — Numeric Variable
STR — String Variable
SM — State Machine
ST — State
TM — Timer
SCR — Script
AP — Activity Programming
WA — Walkthrough Activity

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